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ABSTRACT

This publication brings together seven papers exemplifying the systems approach to educational decision making. The first discusses the need for inclusion of constituent values in educational decision making strategies to properly apply systems theory concepts. In the second, which addresses systems design for problem solving in schools, recommendations are presented for the school staff to more effectively cope with change and the change process. The third discusses a model of seven functions in the passage and implementation of school law to facilitate special education legislation. A dissemination model known as MOD, designed to determine the process by which an intermediate state agency could act as a linking agent between developers and classroom users of educational products, is described in the fourth paper. The fifth presents a systems view of learning focused education, defines LFE, develops a systems model, and presents a learner system. In the sixth, the three major elements of a career education delivery system are defined and the relationships among the planning, implementing, and evaluating activities are developed. The final paper discusses educational program evaluation and shows the value of system design in method selection and the analysis and interpretation of data. (Author/RAA)

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APPLYING SYSTEMS RESEARCH IN EDUCATION

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FOREWORD

The systems approach can and needs to be applied to many areas of educational decision-making. New systems models which will better integrate and utilize educational resources in the home, school, and community--are needed. For too long formal and informal learning experiences, processes, and methods have been fragmented. Students as well as educators have not been reaping the full benefits which would be possible if better coordinated efforts, and more efficient approaches were utilized. This publication brings together a set of seven papers, presented at the 1975 Annual Meeting of the American Educational Research Association in Washington, D. C., at two sessions sponsored by the Special Interest Group on Systems Research. The papers address the need for utilizing the systems approach in the field of education.

The first paper, by Richard H. Barbe, discusses the need for a decision-making strategy in education which reflects the values of the constituents in the system. Barbe maintains that too often educators have limited the openness of the decision-making process and have not directly applied systems theory concepts to educational design. Robert Barger, from Ohio State University, discusses a systems design for problem solving in schools. He presents a series of recommendations for more effective improvement in schools; that is, ways for school staff to more effectively cope with change and the change process. The paper by Emanuel Mason, Joseph Prus, and William Stilwell presents a model to follow to facilitate passage of school law. The authors discuss seven functions in the passage and implementation of school law in terms of special education legislation. Fred Fifer, Jr. and Ann Bennett discuss a project designed to determine the process by which an intermediate state agency could act as a linking agent between developers and classroom users of educational products. The dissemination model developed to inform the classroom teacher of new alternatives for teaching is known as MOD.

Bela Banathy presents a systems view of learning focused education (LFE), defines LFE, develops a systems model of LFE, and presents a learner system. T. Antoinette Ryan presents a model for implementation of a career education delivery system. The three major elements in the delivery system are defined, and the relationships among the planning, implementing, and evaluating activities are pointed out. The seventh paper, by Maurice Eash, discusses evaluation of educational programs, and how systems design can be useful in choosing methodological approaches, in analyzing data, and in interpreting data.

Honolulu, Hawaii
October 1975

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DYNAMIC SYSTEMS AND STATIC GOALS: AN EDUCATIONAL DILEMMA

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It is necessary to state the point of this paper directly, right from the outset, so that it will not get lost in the verbiage of illustration and explanation: if the decision-making strategies of an open system are designed to be consistent with a dominant or consensual value of the suprasystem (environment); then any decision made, regardless of its direction, will be consistent with that value and, hence, will be judged appropriate by the environment (suprasystem). In the schematic illustration of various systems, there are decision-making points either shown directly or implied. The input or information-flow into these decisions comes from either other subsystems or from the suprasystem. But what is rarely illustrated is the input into the structuring of the decision-making process itself. What we have, in other words, is information useful to the decision. What we do not have is information on the strategies for decision-making. What information, for example, tells us who--what person or what group--will make the decision? What information tells us how to prioritize such decision bases as personal pleasure, political expedience, economic miserliness, or social benefit? In flowchart language, what we have is an input line entering an empty decision diamond.

In education, it seems we have historically tried to limit severely the openness of our system. We have developed rather sophisticated mechanisms for determining what environmental factors we will permit ourselves to be influenced by. Perhaps it would be much more accurate, here, to speak of the schooling system rather than the educational system. Then the point would hardly need elaboration. The disjunctions between the schooling system and its larger social system have been rather passionately described by others.

But the mechanisms, in systems-theoretic terms, by which we have limited this openness, do provide some useful clues about change. Generally, what we have done is to limit the interaction to one operation or task called, variously, "define objective," "specify goals," or similar titles. We have limited the openness of the system by trying to regularize the flow from the environment into just this one activity.

The other system components have been held to be more "professional" in character. That is, they appear to be most properly designed, by professionals, apart from direct suprasystem impact. Relating this to two educational systems models, it appears that the change from toput to input in the S.I.G.S. model of the Maccias and the shift from input to information in David Ryans' 1963 model are, by implication, self-selective operations. That is, the educational system--not its suprasystem--determines for itself what from the environment is relevant to the design and functioning of education.

It would appear that there are two current, related and conflicting trends in education. First, the membrane separating the education system from its environmental suprasystem is becoming increasingly permeable. Mike Nunnery of the University of Florida presented a paper at the 1975 meeting of AERA in which he listed four significant education trends, the first of which was the increasing disappearance of the boundary between educational administration and governance and public administration and governance. He cited several examples. Among these were: (a) the increased fusion of human services, including education, into single governmental agencies; (b) the opening up of many administrative and governing bodies' deliberations--the so-called "sunshine" laws; and (c) the decentralization of some administrative functions--the creation of area or subdistrict boards to subdivide large school districts, for instance. Many other indications exist to show the increasing pressure from the environment to impact the education system more directly.

In opposition to this trend is the tendency of the education system to channel, to structure, to regularize, to routinize, and, hence, to control such impact. The creation of community councils and lay advisory bodies, and the increased use of the Delphi and other techniques are providing additional information from the environment to the ducationists. And this is important. But such mechanisms do, at the same time, regulate the kinds, amounts, and entry points of such information. In short, this produces a limited, or regulated, system openness.

Both of these trends have reinforced each other and together they have prompted a significant interest in and concern for educational objectives or goals. Societal concerns are satisfied if the objectives sufficiently represent these same societal concerns; educators' protective needs are satisfied if their design and operation functions are not impacted directly.

This goal concern has been reinforced, too, by educational systems engineers. In general, these people have not sought to apply systems theory concepts directly to educational design. Rather, they have, most often, borrowed systems applications from other fields--engineering and corporate management most notably--and have tried to adapt these applications to education. And most all of these applications are linear program models. That is, they presume the specification of a single, static goal as prerequisite to system design.

So we have environmental concerns, educationists' needs and engineers' promises fusing into a growing tendency to try to establish concrete objectives for educational processes. And at some levels this can be done successfully. For small educational subsystems--particular, specific units of instruction, for example--there is a sufficient degree of constancy to permit the implementation of the subsystem before the objective becomes dysfunctional. In such a subsystem there is also the opportunity to stand off on a perspective-providing platform. A location which permits view, and, thus, designing based on a total view--we can see the entire subsystem and all of its components all at once.

But in education writ large, i.e., the education system, neither of these conditions can be found. Change through time is rapid enough that

we suffer from what John Hayman calls the "out-of-kilter time problem." By the time we design and implement a system, the objective is out of date. And, there is no platform from which to view education wholistically. As we educators try to describe and design educational systems, we must be aware of the dictum of Pogo: "they is us." We are inside the system shaking it and rattling it as we try to model it. If this is sufficient statement of the dilemma, then, return to the point made at the outset for one possible solution.

If there is in society, or at any level of society, a dominant or consensual value, let it be expressed not as a goal but as it can be made manifest in a decision-making strategy. Let the ways in which educators make decisions reflect the value(s) of their constituent publics and the educational system will be publicly doomed to success. There is one precedent example. Thomas Jefferson and the other drafters of the U.S. Constitution did not try to forecast the world of, even, the nineteenth century. Nor did they try to prescribe such a future. Rather they built decision-making mechanisms which, themselves, reflected a value held by consensus to be timeless. Their processes are being tested today as never before, but there is still some reason (or is it but a hope) to believe that these processes can and will remain vital. A similar design strategy in education appears to be worth consideration.

FACILITATING BUILDING-LEVEL PROBLEM SOLVING: ADOPTING SYSTEMS DESIGN TO HUMAN DEVELOPMENT

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During the past 10 to 15 years, substantial amounts of human energy and resources have been poured into attempts to develop improved instructional materials and techniques. Accompanying these developmental efforts has been a great deal of research and evaluation aimed at testing and demonstrating the gains in educational output that could be expected. While many of the instructional innovations that have resulted have been successful, the overall picture that emerges is inconclusive at best. Research and evaluation reports are filled with conflicting findings regarding the merits of many innovations.

Furthermore, the dissemination and utilization of innovations has been a continuing problem. One factor behind the severe cutbacks in budget for the Research and Development Laboratories and Centers has been their consistent difficulty in demonstrating the widespread adoption and impact of instructional products. The fiscal and personnel resources of the labs have been limited primarily to product development rather than adoption.

When undertaken, however, systematic efforts at dissemination and installation are not necessarily effective. Many factors have the potential to adversely affect the installation of an innovation; these factors have been treated extensively in the literature on social change and their review is beyond the scope of this paper. The interest here, rather, is to approach the problem of change from a particular perspective and to develop a series of recommendations for moving more productively into the arena of utilization. The ultimate goal, of course, is to find more successful approaches to facilitating improvement in schools.

Throughout this paper, the author will be operating from one central proposition: that successful educational improvement efforts stem from processes and forces that are indigenous to a given setting. Specifically, they result from efforts at professional problem solving by persons responsible within that setting. Efforts at problem solving stimulate and are reinforced by a closely related phenomenon: the individual and professional growth of the persons involved.

Consider teachers for a moment from this perspective. A teacher clearly has the most influence over the quality of learning of children. Accordingly, most instructional products are designed for utilization by teachers and the children with whom they work. However, a teacher who does not understand or appreciate the uses of a particular instructional resource is apt to treat that resource in such a way as to diminish or negate its effectiveness. Understanding the utilization of a resource requires relating that resource successfully to the specific objectives

and styles of individual teachers. It is therefore critical that teachers understand the possibilities that are inherent in a resource for their individual situations.

It is precisely at this point, that many instructional development efforts have failed. By and large, instructional innovations tend to be viewed by their creators as commodities to be disseminated to teachers with the assumption that teachers would use them as "instructed." Insufficient regard has been given to the professional autonomy which teachers possess and employ readily within their classrooms. The position taken here is that teachers' own development in their understanding of the nature of children's learning problems, their formulation of the teaching objectives which reflect these problems as they understand them, and their participation in the design of the utilization of a resource in the classroom are all essential to the successful utilization of that resource. A teacher's professional and individual development in this sense is critical to his or her ability to effectively participate in the development of children.

The same can be said of persons in other professional roles in schools. Each within his or her own sphere is faced with a given range of problems; each is confronted with the necessity for individual growth and for problem solving behavior to meet the needs of very real situations.

The foregoing suggests that developmental efforts in education must proceed from a substantially different perspective than has been the case in the past. First, we must admit to the classroom as an essential frontier of action. Efforts that do not ultimately bring about positive change in behavior of students and teachers are of little real value.

Second, teachers are key decision-makers for what actually happens in classrooms. What they perceive, what they value, what they decide and how they act are critical. Development in the classroom thus requires development in the teacher. Otherwise, there will be little behavioral change regardless of the "newness" of the materials or equipment used.

Third, innovations will be employed successfully only when related realistically to the awareness of teachers of their objectives and needs. The incorporation of new methods and materials is then a function of successfully interfacing such innovations with teachers' attempts to improve their own effectiveness, with the final decision on trial or adoption being individually or collectively in the teachers' hands.

Fourth, the same essential conditions hold for other professionals; their utilization of new procedures and processes is a function of successfully interfacing such innovations with their attempts to improve their own effectiveness.

Fifth, given this perspective, a change strategy that attempts to help individual professionals improve their effectiveness in dealing with problems they perceive will have a greater potential for facilitating the testing and adoption of innovations. Reference here is made to

the more than the commonly held dictum that the "chiefs" should include the "indians" in decision-making if the innovation is to be "accepted." Rather, the innovation should be a function of, or perhaps better yet, an expression of, the attempts of both "indians" and "chiefs" to analyze and to improve their individual and collective performance. At the very least, the innovation and the processes employed in its utilization should possess the potential for becoming a vehicle for the growth of the persons involved.

Sixth, the utility of particular disciplines commonly associated with change processes, such as research or evaluation, depends upon their function in the developmental process suggested above. As with instructional innovations, their utilization will also be a function of successfully interfacing appropriate methodologies and skills with teachers' and other professionals' attempts to improve their own effectiveness. Implied here, of course, is a shift from the preaching commonly heard that teachers, et al., "ought" to use evaluation or research, to the employment of strategies for professional and individual renewal within which technologies such as evaluation can become functional tools that are welcome.

By reviewing the previous comments and statements, it can be seen an evolutionary view of educational development and change is being proposed; a view that takes the individual professional as a key in the process. This view does not negate group process nor necessarily lessen the role of administrative authority or centralized decision-making. Rather, it attempts to establish a balanced perspective. The evoluation of individual professionals is critical to the evolution of schools as settings for the growth and learning of children. This is as true of the administrator, or "central decision-maker," as it is of a classroom teacher; furthermore, it is an indispensable ingredient in fruitful group and organizational processes. Thus, positive change is viewed here as the result of the stimulation of growth processes intrinsic to the individual. The evolution of individuals within an organization is thus seen as critical to its ultimate success and to its shape, character, and content. The integrity of individuality is forever present; inevitably it takes its toll, extracts its pound of flesh, and exerts its influence, whether positive or negative.

In Spring 1974, the Ohio State Chapter of Phi Delta Kappa sponsored a conference in problem solving in educational settings. At this conference the author presented a paper that outlined two interlocking schemata that take into account the preceding propositions. The first of these schemata was an approach to problem solving at building and classroom levels designed to facilitate the diagnosis and solution of instructional and administrative problems, with the teachers and administrators responsible for dealing with those problems being the major actors. Technical aspects, such as evaluation, were viewed as specific sets of facilitating skills serving important functions within a larger process. Establishing problem solving as a systematic, on-going process should provide for a continuity of creative work necessary to the continual renewal of teaching and administration.

The second schema proposed structured arrangements through which university-based personnel could stimulate and facilitate the development

of problem solving capabilities in schools and classrooms. This schema interfaced inservice training, staff development, graduate programing, and team building strategies around applied problem solving in a building setting. The ultimate intent of both schemata is the improvement of schooling for children.

During the past year there were opportunities to test the schemata presented in this paper in several school systems in the Ohio State University area. These opportunities have been valuable in refining and clarifying those elements that appeared to be most relevant. In developing the present paper the purpose has been to explore the utility of several systems models for their utility in revising the original schema. The first of these models was that developed by Gerald Nadler and published in his book entitled Work Design: A Systems Concept. The second model was one developed by the author several years ago and which was presented at a symposium held at the AERA convention in 1973. The third model is that developed and presented by Bela Banathy in his book entitled Developing a Systems View of Education. The fourth model is the SIGS Theory formulated by George and Elizabeth Maccia. While all of these models have had some impact upon the material that follows in this paper, reference will be made primarily to the models developed by Banathy and by the Maccias. These models were found to be most useful in organizing various aspects of the testing experiences with problem solving in schools.

Outlines of a Support System for Problem Solving in Schools

Environment of the Support System

Our first level of consideration will be that which Banathy refers to as the general systems environment model. In Figure 1, major peer systems and suprasystems with which the problem solving support system is related have been identified. The first thing to note is that the support system transcends the boundaries of the building system of which it is an essential part, with the purpose of interrelating various professional service systems to those problem solving activities occurring within the building system. Within the building, the problem solving support system interacts primarily with individual teachers and administrators who are involved either singularly or in groups in problem solving activities. Through the activities of these individuals, the support system in turn comes into contact with the administration system and with the instructional system, broadly defined, as these exist within the building. Indirectly, the support system becomes involved with individual learners and in that sense with learner systems. However, the primary function of the support system is to facilitate problem solving activities of individual teachers and administrators.

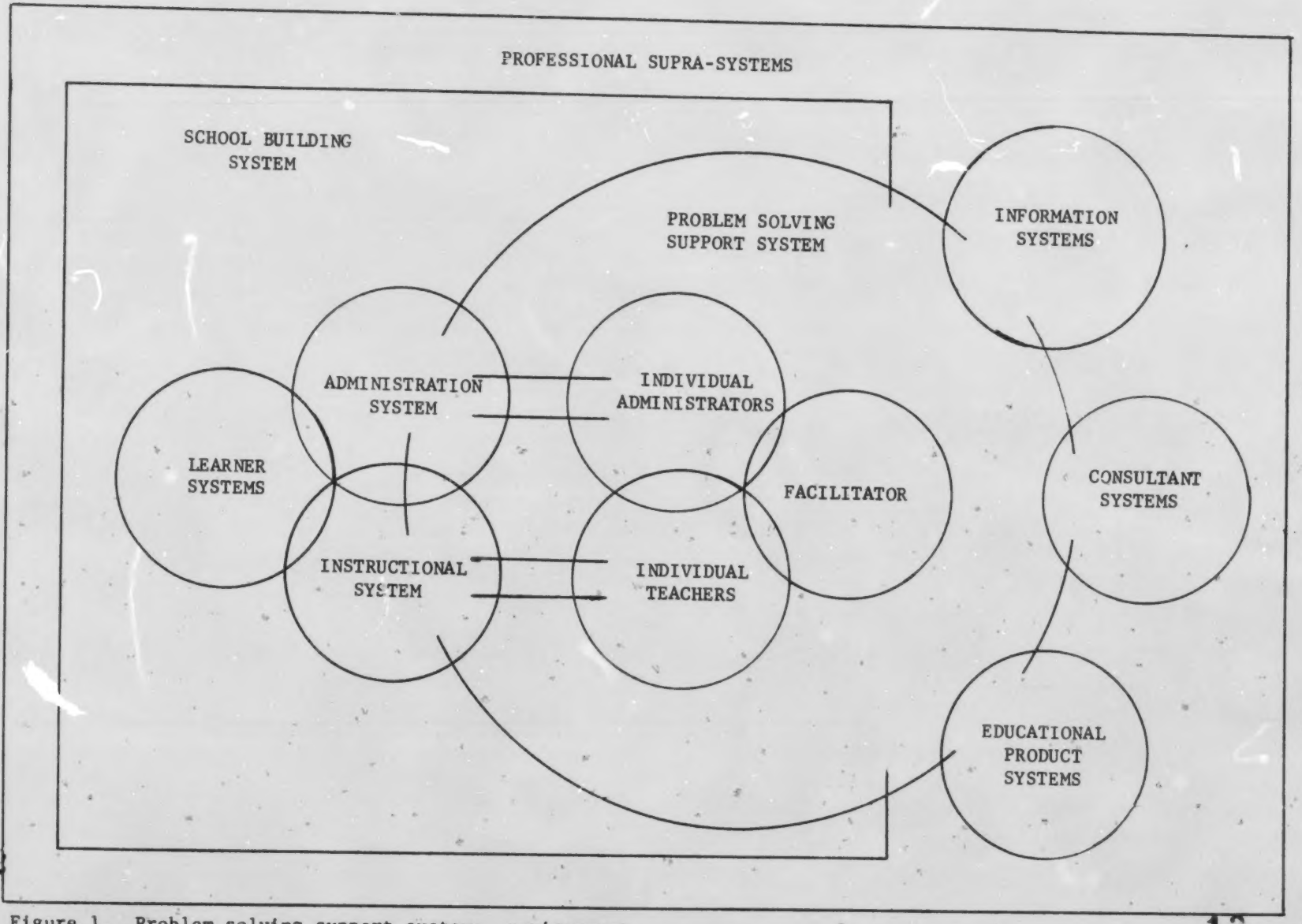

Figure 1. Problem solving support system: environment.

Given the trans-system linkage function of the problem solving support system, its physical boundaries then become quite diffuse, touching upon a number of systems both within the building and external to the building. Its economic boundaries also are relatively diffuse, including not only the resources of the school building or the school systems within which it primarily resides, but also those resources that are available through services of agencies such as state department of education, universities, regional laboratories, federal agencies. These resources can be described both in terms of free professional services and funds that may be available for special programs. In this sense the support system can provide a resource linkage function that can be important to the activities within the school building itself.

The physio-biological characteristics of the support system can be defined primarily in terms of those characteristics of teachers, administrators and support system personnel who are engaged in problem-solving activities. To a lesser degree it would also include those external resource persons who become involved in building activity, as well as students and parents. The psychological boundaries of the support system are defined by the attitudes, beliefs, customs and traditions of those persons within the building, and by an even more general characteristic which may simply be labeled the climate of the building itself as a total system. The social boundaries of the system also extend beyond the building itself to include those community and professional agencies and settings with which the support system may become engaged while serving its primary function with persons within the building.

Those entities that affect the system or with which the system may become engaged would include teachers, administrators, and other school personnel directly involved in problem solving. Related entities would also include the various definable systems within the building, such as the administrator system and the instructional system, and would also include those various resource systems external to the building with which the support system would become engaged. Within the building, we could also name such entities as the children involved, the physical plant, space, equipment.

The most important inputs of the problem solving support system are those related to the clients which the system is designed to serve. These clients would be those teachers and administrators involved directly in problem solving. Inputs from such persons would include the problems with which they are attempting to deal, information coming from them to persons within the support system, their attitudes, and perspectives. In addition to client inputs, there would also be resource inputs to the support system. These would include available information concerning educational programs and students within the building or within the school system at large, materials and equipment which might be involved in problem solving activities, and technical expertise of persons external to the building. The primary outputs of the support system would be the services provided to teachers and administrators engaged in problem solving. These would include such things as information linkage, technical assistance, consultants contacted, skills developed on the part of problem solvers, and interpersonal skills and team phenomena developed within

the building. Feedback from the environment to the system would include evaluation of the adequacy of the services of the system to its clients within the building.

The relationship between the problem solving support system and its clients is primarily a hierarchical one. The support system is created to serve the needs of its clients within the building. As these needs change so the system itself would have to change in order to better fulfill its functions. In this sense the support system is subordinate to its client systems. The relationship of the problem solving support system to those systems outside of the school building is centralized, i.e. its function is to intergrate the resources of various external systems so that these may be brought to bear more efficiently on problem solving efforts within the building itself. We could of course apply such adjectives as open, adaptive and self-regulating to the problem solving support system as we conceive of it.

Systems Structure: Needs-Goals-Functions-Components

The major purpose of the problem solving support system is to facilitate problem solving activities of individual teachers and administrators within the building. The major entities being transformed by the system are services related to the problem solving activities of such persons. Concomitant transformations involve the values, skills, and professional and invidual development of the persons involved. The needs being met by the system are those which can be identified as germane to problem solving behavior. These needs can be summarized as follows:

1. Information of a feedback nature which would be internal to a school building, including that information from classes of an individual teacher who might be involved in problem solving, as well as additional information from within the building that might be useful.

2. External information from sources outside the building that could be useful in diagnosing the nature of the problem being dealt with in a particular instance, and in identifying those solutions or alternatives that might be available to the problem solver.

3. Skills necessary to successful problem solving.

4. Technical assistance in the processes of problem solving.

5. Facilitation of problem solving processes, probably involving direct personal interaction with another individual serving as a facilitator.

6. Technical linkage between problem solving efforts within the building and external resource systems and personnel or consultants.

7. A climate within the building conducive to the support of problem solving behavior.

8. Facilities and equipment necessary to conducting problem solving activities.

9. Flexibility in arrangements and scheduling in order that solutions be tested.

10. Time on the part of personnel to engage in problem solving activities.

11. Financial and personnel resources necessary to support problem solving activities.

12. Team building activities for those situations involving group problem solving efforts.

Figure 2 provides a listing of the systems goals and functions which can be derived directly from this list of needs. It should be noted that the above list of needs has been generated from literature in problem solving, creative behavior, and educational and social change, in addition to the experience of the author and his colleagues in working with problem solving teams in schools.

Before discussing components of the problem solving support system, it is necessary to discuss some very general considerations concerning the nature of the system itself. First, the system would consist of individuals and institutional arrangements whose purpose it is to serve clients who are dealing with perceived professional needs. It would be a mistake to think of the support system in a highly structured sense. Rather, given the informal character of relationships within a school building as a social system, the support system would need to be thought of as a loose federation of available resources and capabilities to be called upon and integrated by the client with the help of another person serving as facilitator. The system would not be characterized in most buildings by extensive equipment, office space or administrative arrangements. Rather, its major components could well consist of a facilitator or facilitators whose responsibilities are to articulate a variety of resources both from within the building and external to the building in relation to client problems. Thus in discussing components it is found that certain functions tend to generate observable objects or arrangements that are extant within the building, while others will require the identification of services and resources which can be tapped but which will not normally be a functioning part of the building itself.

1. To provide external information linkage for problem analysis and solution selection/development.

2. To provide internal information linkage for feedback.

3. To provide training in skills necessary to problem solving.

4. To provide technical assistance in problem solving.

5. To provide linkage to technical expertise.

6. To provide process facilitation to the problem solver in his attempts to deal with the problem.

7. To provide team building experiences for group problem solving.

8. To stimulate and otherwise help develop a climate in the building conducive to problem solving.

9. To coordinate or help coordinate, among problem solvers and administrators, the use of facilities, equipment, scheduling, time, necessary to problem solving.

10. To coordinate, or help coordinate efforts to plan for and acquire resources for problem solving.

Figure 2. Goals-functions: Problem solving support system.

External Information Linkage. Information is a critical ingredient in becoming aware of and diagnosing problems, and in selecting and evaluating solutions. A very early step in implementing a systematic approach to problem solving would be to establish contact between individual professionals in buildings and external information services and sources such as ERIC, Phi Delta Kappa's School Research Information Service, university libraries, and community agencies. A second step would be to establish a carefully selected library of reference sources and key references within the building. Training teachers and administrators to use these materials and resources would be a very important related task. This would include at least some minimal training in the evaluation and utilization of knowledge obtained from such sources.

Some problems would also require information from other sources internal to a school system but external to a particular building, such as school-wide test results, or managerial data. Accessibility to records and other information sources within a school system would require cooperation among personnel and some minimal system for storage, retrieval, and communication. Guidelines for accessibility to and use of such data would be important.

Internal Information Linkage. Problem solving will also require information from those sources internal to a building, such as student files, data from individual classes, and program evaluation data. Especially critical to individual teachers will be feedback information concerning their own behaviors in their classrooms. Training in the generation and interpretation of such data will be especially important as a part of any general problem solving strategy. Accessibility to such data generated within a building will require cooperation among personnel and will also require some system within the building for storage and retrieval. At the minimum, there should be arrangements for test scoring and item analyses of classroom tests and evaluation instruments. Availability of statistical analysis would be important as problem solving efforts begin to reach field test or evaluation stages. Most schools do not have this kind of capability, but can establish service relationships with other institutions that do.

Facilitation. Practical limits in skill building coupled with serious limitations in time faced by all school personnel suggest the need for a building-based support person who could provide on-site help to individuals at various stages of problem solving. Such a person would need a breadth of skills, including a knowledge of the dynamics of interpersonal relationships in school settings. His/her most important function would be to facilitate problem solving in its various stages through direct assistance given to problem solvers. Such a role may not necessarily be new in at least some of its aspects. Principals, coordinators, and even fellow teachers to some extent have provided limited technical and psychological support to each other in specific circumstances. What is suggested here however, is a more thorough-going set of behaviors to which the term "developer" might be attached. This developer role might be played by an existing person or persons in the building, or might involve a new person added to an existing staff.

The developer's role would be defined by the various functions which are identified above. Some of these functions would engage a considerable amount of time, while the relationship to others would be somewhat more indirect. During early stages of problem solving, a very critical function of the developer would be to assist problem solvers in identifying and analyzing problems. The developer could provide technical help, including information linkage and psychological support, in addition to serving as a kind of conceptual catalyst, sounding board, and devil's advocate. Other functions of the developer would include the facilitation of: (a) inservice instruction, (b) team building, (c) technical linkage to external consultants, (d) stimulation of a climate conducive to problem solving, (e) coordination of special arrangements that might be necessary for problem solving, including flexibility in scheduling, and equipment, and (f) coordination in the obtaining of additional resources, both financial and personnel, that might be needed in a particular building setting. These latter functions may require some additional explanation. It is not suggested that the developer would take over the administrative roles in the building related to equipment, scheduling, space, and so on. What is suggested is that the developer would work closely with problem solvers and administrators in making arrangements for obtaining these various resources.

Generally, the following conditions are most critical, in the author's view, for enhancing the effectiveness of the person in the facilitator role:

1. That he genuinely be able to listen to the problem solver and to understand the problem and his perspective, i.e. that he not have a personal axe to grind on the issues involved.

2. That he remain open with regard to a best solution, i.e. that he not have a "pet solution" that he then tries to lay on the problem solver,

3. That he maintain open communication to all parties in a group setting; that he not be seen as an advocate of one person or position,

4. That he maintain credibility in the eyes of the problem solver, i.e. that he not allow himslef to be viewed as an agent of the administration or any other outside party.

Havelock, in his excellent handbook and guide to innovation in education, recognized these factors and lists additional ones that are important.

Skills: Inservice Training

The types of activities outlined will require skills that most teachers and administrators have had little opportunity to acquire. The sophistication of some of these skills and the time required for their mastery suggest the need to establish a practical, feasible approach. Problem solvers would need to develop elementary, application-oriented skills in the areas listed in Figure 3. More sophisticated skills in these areas

would have to be supplied through the availability of technical support personnel. Systematic programs in inservice training would be helpful in improving the problem solving capability of individuals involved. Integrating such training with problem solving processes would hopefully provide a climate for more efficient learning. The schema of university-school cooperation to be presented later provides a natureal setting for such training.

Building Climate

Previous experiences in building and classroom level "action research" and "evaluation" have convinced the author that the psychological climate within which individual problem solvers work is critical. First, and of foremost importance, is the problem solver's own perspective on his activities. His values and his perceptions are critically manifest in his approach to the problem; thus directly affecting the outcome. Furthermore, the degree to which the problem solving activity is consonant with his own individual and professional development affects the energy, inspiration and dedication that he can bring to the task. Is his professional work a medium for his own individual and professional development; do his problem solvin; attempts represent a significant individual thrust? These are critical questions.

These questions were discussed earlier in a somewhat different way when the importance of individual creativity as a crucial aspect of the change process in schooling was discussed. The interface between the thrust of individual creativity and the overarching goals, values, and climate of the building provides the crucible within which problem solving occurs. This crucible requires both freedom and responsibility: the freedom to pursue innovative ideas, to discuss, test, refine, and evaluate their implications; the responsibility not only to challenge the system when fruitful but to retain functional continuity with previous practices, and to maintain integrity of learning experiences for children.

Looking beyond the perspective and attitudes of the individual problem solver, several important conditions within the building can be identified that are important to problem solving. These would include (a) administrative support and leadership, (b) feelings of trust and respect among colleagues, (c) willingness of colleagues to accept innovative behavior, (d) open channels of communication among individuals, and (e) willingness of individuals to cooperate with each other in group activities when necessary. At this point, of course, skills and processes that are germane to the field of staff development are being discussed. One of the important activities of the building developer or facilitator would be to conduct a program in building-wide staff development.

An understanding of individual developmental processes as these relate to problem solving.

An understanding of one's own creative behavior in problem solving.

Skills in self-discipline for creativity in problem solving.

An understanding of group processes.

Skills in interpersonal communications.

An understanding of the stages in development/problem solving processes.

Skills in linking with information systems.

Skill in assessing and utilizing information.

Skill in analyzing and synthesizing problems.

Skills in stating goals and objectives.

Skills in identifying, simulating, and assessing solutions.

Skills in selecting and/or designing solutions.

Skills in interfacing with consultants.

An understanding of the stages in evaluation processes.

An understanding of the uses of various evaluation instruments.

Skills in developing selected instruments.

Skills in collecting data.

Skills in using selected analysis techniques.

Skills in interpreting data and assessing the value of a solution.

Figure 3. Skills utilized by clients (teachers, administrators) engaged in problem solving.

Team Building. Many problems confronted in school buildings will require group effort for their solution. Team building will become a very necessary reality in order for problems of this type to reach successful solution. Within the support system suggested here, the team-building function is seen as being coordinated primarily by the developer or building facilitator. His role would be to assemble a group of persons concerned with common problems, and then to employ group process techniques that would help build a team spirit and a willingness for group cooperation among the individuals involved.

Technical Assistance/Technical Linkage. Technical assistance in many aspects of problem solving could be provided by the building developer role as defined above. In some cases, however, technical assistance beyond the capability of the developer may be required. In these situations, the developer can provide a technical linkage function to external consultants who have the capacity to provide the level of skills needed by the problem solver or by a problem solving team. The developer himself might contact such a consultant or he might put the problem solving team or the individual problem solver into contact with the consultant.

Coordination of Activities. The various coordinating functions listed in Figure 2 would, within the support system, be provided primarily by the building developer. Again coordination here does not mean the assuming of administrative responsibilities usually carried out by the building principal or by other administrators. Instead, reference is being made to the linkage of those administrative services to the efforts of individual problem solvers or problem solving groups. The developer is seen as performing a very important role here in helping to generate resources and in helping to manage changes in scheduling, space utilization, and so on, that would be required for successful problem solving. The developer would also perform a very important function of coordination and communication among individual problem solvers or among problem solving teams.

Support System Processes

The major purpose in discussing support system processes is to convey some realistic idea of how system components would interact. System processes at both macro and micro process levels, and in relation to specific phases of problem solving activities will be examined. As has been suggested above, the problem solving support system is not a highly structured and closed system, but rather may be described as a network of capabilities that can be activated in relation to differences among clients, among problems, and among phases of problem solving activity. Thus, a fairly concrete approach is required to illustrate the operations of the system.

Macro-Process Description. It was stated above that the major function of the support system is to facilitate problem solving efforts of

clients, that is, to provide inputs for utilization by clients. Its operations are thus essentially service in nature, and are affected primarily by the needs of clients. If client operations are examined during a given phase of problem solving activity, those inputs required from the problem solving support system can be listed and described. These inputs to the client system represent outputs and major entities being transformed by the support system. These inputs also represent points of transaction between the client system and the support system. For the sake of discussion, the problem analysis phase of problem solving will be examined.

Several of the systems models reviewed here provide very useful paradigms for analyzing and describing client system processes involved in problem analysis. The left-hand column in Figure 4 lists major systems processes as identified by Banathy. The right-hand column provides a listing of inputs from the support system related to these processes during problem analysis. This listing draws upon the description of functions and components of the support system discussed (Figure 2) in the previous section, and attempts to articulate these in a wholistic fashion. In addition to activities it was attempted to identify actors, and in this fashion describe the central role of the problem solving facilitator or developer.

Input processes involve interaction, identification, activation of inputs, and feedback. Inputs from the support system consist primarily of information obtained from one or more of the following sources: external information systems, external consultants, and the internal collection of feedback data concerning previous behavior of the client and/or other educational outcomes within the building. The facilitator and the client would work together to list, select, and obtain information/data from one or more of these sources (Figure 4) depending on need. The client and the facilitator would assess the value of the information derived and make adjustments in their operations designed to improve the quality of information obtained and the efficiency of the facilitator's behavior. These input processes would be recycled as needed.

Transformation processes include production, facilitation, and control. The primary entity being transformed through the system consists of the problem solver's conceptualization of the problem. The output presumably would consist of a well articulated frame of reference for viewing the problem and a set of fairly specific objectives for dealing with the problem. Inputs from the problem solving support system would include (a) critical evaluations of client's work by the facilitator, (b) psychological support from the facilitator, and (c) management and resource coordination by the facilitator. Production operations would include work sessions between client and facilitator as well as individual work sessions for each. Production systematization would involve the development of productive relationships between the client and the facilitator. It would also include efforts to increase the client's skill in dealing conceptually and creatively with the problem, and the facilitator's skill in working with the client. Facilitation processes include energizing and maintenance. Energizing would include efforts by the facilitator to stimulate the client, to provide him with useful suggestions, and to generally supply a supportive psychological climate within which the problem solver can work.

Client System Processes	Inputs from the Support System		
Inputs	Facilitator assists client in obtaining information from one or more of the following sources:		
	Information Systems	**Consultants**	**Evaluative Data: Client Feedback**
Interaction	List possible information sources	List possible consultants	List possible data of value
Identification	Select relevant sources	Select relevant consultants	Select relevant data items to be collected
Activation	Information sources	Consultants engaged	Data collected, analyzed, interpreted
Feedback	Client and facilitator assess value of sources	Client and facilitator assess value of consultant	Client and facilitator assess value of data
	———— Input process recycled as necessary ————		
Transformations	Facilitator assists client in formulation of problem and objectives through the following:		
	Critical Evaluation	**Psychological Support**	**Management**
Production: Operations	Evaluate client ideas/ make suggestions	Facilitator accepts and encourages client	Facilitator arranges schedule of sessions, coordinates resources
Systematization	Facilitator works to improve quality of relationships with client; facilitator and client work to increase effectiveness of individual efforts; facilitator and client work to improve effectiveness with other systems operations.		
Facilitation: Energizing	———— Facilitator helps coordinate obtaining of resources; ———— provides psychological stimulation		
Maintenance	Facilitator and client maintain schedule of contacts, conferences, work sessions. Facilitator attempts to coordinate resources and arrangements necessary: time, consultant fees, scheduling.		

Control:			
Monitoring	Evaluator seeks feedback from client concerning quality of:		
	Critical Evaluation	**Psychological Support**	**Management**
	Facilitator's critical evaluations and suggestions	Facilitator's psychological support	Facilitator's managerial support
Analysis	Client feedback is analyzed and interpreted		
Adjustment	Changes in services assessed, selected, and implemented		
Output			
Model	Facilitator assists client in identifying criteria for assessing a conceptual framework and objectives.		
Assessment	Conceptual framework and objectives assessed.		
Dispatch	Conceptual framework and objectives used to pursue problem solution.		
Feedback			
Collect Evidence	Facilitator assists client in obtaining feedback information concerning:		
	Client output: conceptual framework and objectives (see Output above)	Client processes during problem analysis	Long range value of output through further problem solving stages
Analyze and Interpret Evidence	Facilitator and evaluator analyze data, identify adjustment alternatives, assess alternatives, select and introduce adjustment in facilitator and client behaviors.		
Construct models of Adjustment			
Stipulate Consequences of Adjustment			
Introduce Adjustment			

Figure 4. Client support processes: Inputs from the problem solving support system during problem analysis.

These supportive movements on the part of the facilitator would be designed to increase the client's level of motivation and available energy in dealing with the problem. Maintenance processes would refer to efforts by the facilitator to maintain a functional schedule of contacts with the client, and to coordinate resources and arrangements.

Transformation control processes would include monitoring, analysis, and adjustment. Monitoring information would consist of feedback from the client to the facilitator on the quality of (a) the facilitator's critical evaluations and suggestions, (b) the psychological support provided by the facilitator, and (c) the facilitator's managerial behavior. It would also include an attempt by both the facilitator and client to assess the adequacy of their individual efforts, as well as the adequacy or productiveness of their common work sessions. Important here, of course, is an assessment of the quality of interpersonal relationships. Analysis would refer to the analysis of the feedback information discussed. Adjustment would refer to decisions and actions taken to improve the relationship between the facilitator and the client, and to improve their individual efforts in dealing with the problem.

Output processes include (a) identification and assessment of the output of the system, and (b) the dispatching of relevant output. Identification and assessment of systems output involves the utilization of an appropriate output model as a basis of judgment. The output of the system at this point has been identified as consisting of a well-articulated frame of reference and a set of objectives related to the problem. While one could not easily create a substantive model for a specific problem, one could identify criteria for judging the conceptual adequacy of a frame of reference and for judging the clarity and utility of stated objectives. These criteria could then be applied to assessing the output. If deemed adequate, the conceptual framework and objectives developed could then be utilized as a basis for designing or for identifying existing solutions for the problem.

Feedback processes would include the collection and analysis of information concerning the adequacy of system operations while engaged in problem analysis. The primary question is, "What changes in procedures could have yielded a more beneficial effort?" Procedural alternatives could be identified, assessed, selected, and introduced into the system. The central actor in this process would probably be the facilitator, although hopefully he would have access to the services of an independent evaluator.

A review of systems operations in this one stage of problem solving reveals several important considerations. First, the support system, in supplying relevant inputs (needs) into the client system, has integrated at least the following systems components or entities:

facilitator
client
evaluator
information systems
information sources and bits of information

consultant(s)
facilities
time/scheduling
financial resources
data processing capabilities
multiple clients in a team relationship

Second, these components include person systems as well as social systems and machine systems. Third, the support system depends on relatively informal mechanisms and relationships. Fourth, in moving to other stages of problem solving, different arrangements of resources, persons, and systems would be necessary. Different problems in turn, would require somewhat different constellations of resources and systems even at the same stage of problem solving. Thus, the system as such must include a wide-range of available services and resources. Its boundaries in that sense are diffuse and easily alterable. It can be seen, then, the degree to which the system needs to be open and adaptive. At the same time there needs to be clear feedback and control over a potentially wide-range of activities, many of which are person-centered, informal, and some external to the building itself.

Micro-Process Description. In the previous discussion various support system behaviors which functioned as inputs to a client during problem analysis processes were described. These behaviors constitute outputs of the support system and their production can be described in systems terms. As an illustration of the applicability of systems design at this level, the SIGGS model developed by George and Elizabeth Maccia, will be utilized as it is particularly useful for defining these micro-level behaviors. For purposes here, only one aspect of problem analysis will be of concern: the process of interacting with information systems for information that may be useful for problem analysis. By referring to Figure 4, it can be seen that this is one of three types of information processes potentially useful to the client. The facilitator's role here is to provide information, or to otherwise help the client obtain information of value from available information systems. This process involves interactions among client, facilitator, and the information system.

The SIGGS model developed by Maccia and Maccia constitutes an integration of set theory, information theory, graph theory, and general systems theory. It is described by its authors as providing an extension of the basic cybernetic model such as to account for the behaviors of self-constructive systems (Maccia and Maccia, 1975). In the present author's schema, the client and facilitator should be viewed as living systems, that is, as life forms that are self-constructive rather that merely self-maintaining. The model thus seems appropriate to delineate their behaviors during problem solving. Figure 5 provides an outline of the SIGGS model with a brief description of each major function in the system (Maccia and Maccia, 1975). The following outline briefly describes client-facilitator-information systems transactions based on SIGGS theory. In order to limit this discussion to the transactions related to obtaining information, the outline begins with the client's decision to contact the facilitator for assistance. The author interprets this decision as

representing the process identified as feedthroughness in the SIGGS model. The outline is intended to illustrate client, facilitator and information system processes within patterns of cross system transactions.

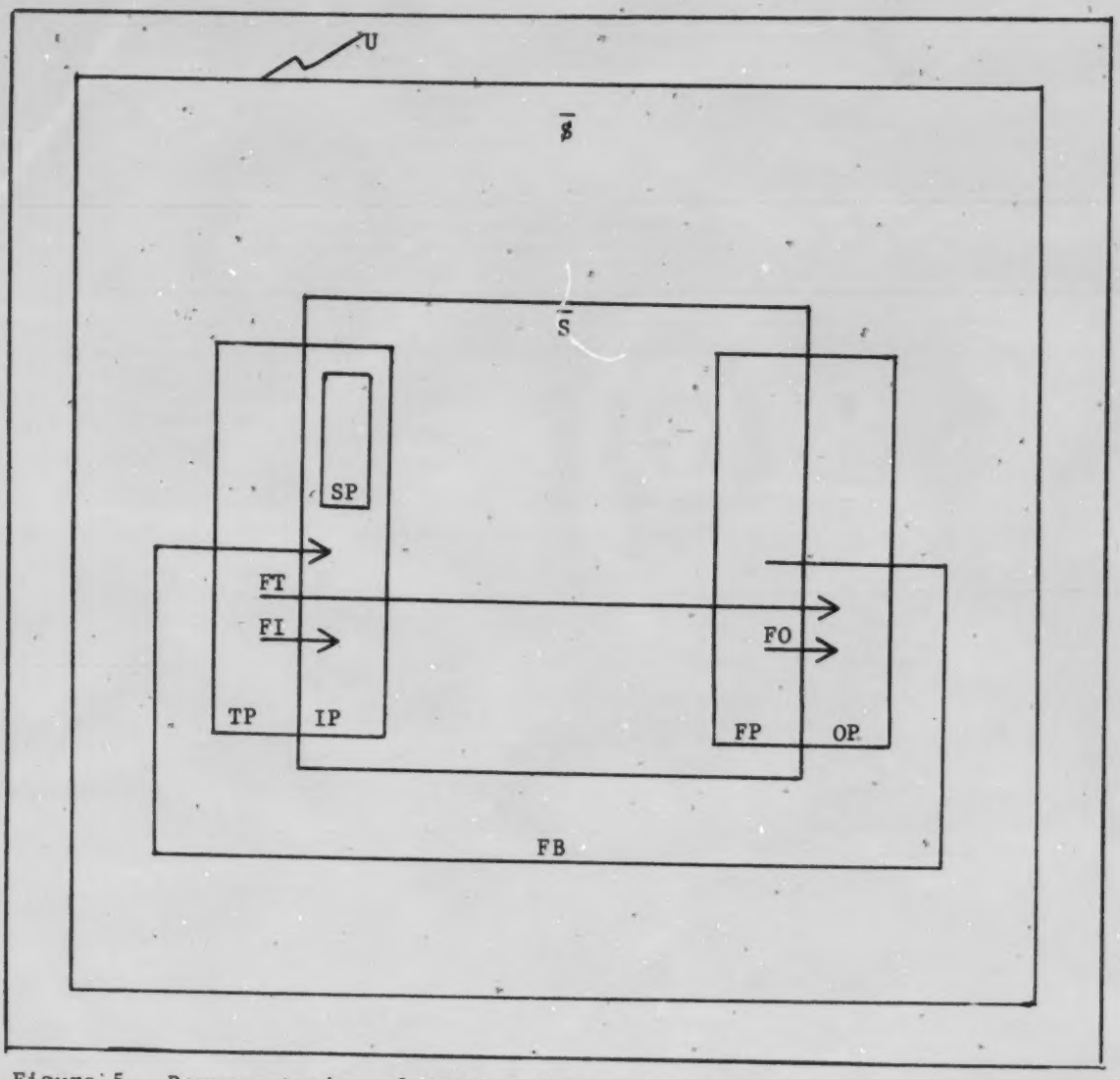

Figure 5. Representation of SIGGS model by Maccia and Maccia (1975).

Note.

'U' stands for universe of discourse
'S̄' stands for system
'S̄̄' stands for negasystem
'SP' stands for storeputness
'FT' stands for feedthroughness
'FI' stands for feedinness
'T̄P' stands for toputness
'IP' stands for inputness
'FO' stands for feedoutness
'FP' stands for fromputness
'OP' stands for outputness
'FB' stands for feedbackness

toputness (TP) - the system's environment or the selective information on the negasystem which is available to the system

inputness (IP) - the system's selective information

fromputness (FP) - the negasystem's environment or the selective information on the system which is available to the negasystem

outputness (OP) - the negasystem's selective information

storeputness (SP) - the system's inputness which is not fromputness

feedinness (FI) - transmission of selective information from the negasystem to the system, i.e. T(TP, IP)

feedthroughness (FT) - transmission of selective information from the negasystem through the system to the negasystem, i.e. T(TP, IP, FP, OP)

Feedoutness (FO) - transmission of selective information from the system to the negasystem, i.e. T (FP, OP)

feedbackness (FB) - transmission of selective information from the system through the negasystem to the system, i.e. T(FP, OP, TP, IP)

Obtaining Information for Problem Analysis: Descriptions of Client-Facilitator-Information System Transactions Based on SIGGS Theory

Client-Facilitator Transaction

Feedthroughness, Client:

Client decides to contact facilitator, reviews information concerning problem to be communicated to facilitator.

Fromputness, Client:

Client's assessment of the problem, client's perception of type of information that may be useful in analyzing the problem.

Outputness, Client:

Client perceptions and behaviors, both verbal and non-verbal, communicated toward facilitator.

Feedbackness, Client:

Feedback from the facilitator indicating the adequacy of the client's communications regarding the problem.

Feedoutness, Client:

Processes of verbal and non-verbal communication from client to facilitator, yielding information as intended by the client.

Toputness, Facilitator:

Messages from the client available to the facilitator.

Inputness, Facilitator:

Information from the client perceived and internalized by the facilitator, including:

(1) Facilitator's perception of the client's perception of the problem.
(2) Facilitator's perception of the client's state.

Feediness, Facilitator:

Process of verbal and non-verbal communication between facilitator and client, yielding information as perceived by the facilitator.

Facilitator-Information System Transaction

Feedthroughness, Facilitator:

The facilitator shapes and transforms output for the information system in terms of:

(1) His/her perception of the stated goals, needs, view of the problem, of the client.
(2) Capabilities of the information system.
(3) The facilitator's perception of the client's level of development in dealing with the problem.
(4) His/her objectives for growth in the client.
(5) His/her individual/professional objectives in engaging with the client.

Fromputness, Facilitator:

Facilitator's perception of information needs of client.

Outputness, Facilitator:

Information requests selectively arrayed by the facilitator for input into the information system.

Feedbackness, Facilitator:

Feedback from the information system indicating the adequacy of the facilitator's communication regarding the information request.

Toputness/Inputness/Feedinness, Information System:

Processes for activating information requests.

Feedthroughness, Information System:

Processing of information requests

Fromputness/Outputness/Feedoutness, Information System:

Processes for communicating completed information requests to the facilitator.

Feedbackness, Information System:

Feedback from facilitator on adequacy of information system output.

Toputness, Facilitator:

Information sources received by facilitator.

Inputness, Facilitator:

Information sources selected as most useful to the client.

Feedinness, Facilitator:

Process of communication between facilitator and information system.

Facilitator-Client Transaction

Feedthroughness, facilitator:

The facilitator shapes output for the client in terms of:

(1) The sources available from the information system.
(2) His/her perception of the client's needs.
(3) His/her perception of the client's stage of development and capability for using information.
(4) His/her objectives for growth in the client.

Fromputness, Facilitator:

Information sources and bits of information perceived by the facilitator as being useful to the client.

Outputness, Facilitator:

Information and suggestions communicated to the client by facilitator.

Feedoutness, Facilitator:

Processes of verbal and non-verbal communication through which information is communicated to client.

Feedbackness, Facilitator:

Feedback from the client to the facilitator on the adequacy of information communicated to the client.

Toputness, Client:

Information messages from the facilitator available to the client.

Inputness, Client:

Information selected as useful by the client.

Feedinness, Client:

Processes of information communication between client and facilitator.

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A SYSTEMS MODEL FOR FACILITATING PASSAGE OF SCHOOL LAW WITH IMPLICATIONS FOR SPECIAL EDUCATION

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School laws over the years have provided structure and enabled educational leaders to perform their roles and responsibilities. An illustration of the importance of school law is the practice of professional education specialty training programs such as administration, guidance, special education, and school psychology which include courses or seminars in ethical and legal considerations in education. As techniques, methods, and community awareness increase in education of the handicapped, it is found that existing legal structures inadequately meet the needs of educational systems. New legislation may be required, or old laws may need to be amended. Yet, few references could be found by the authors which offer systematic descriptions of the social and political as well as legislative steps in passage of school law.

Many Americans have an idealistic notion of government as representing the wishes of the majority by simple reflection of the electoral process. According to this limited view, to have legislation introduced on the floor of the state legislature one simply writes to his or her local representative. Anyone who has tried to affect legislation in this way is aware of the frustrations involved. Often, groups and organizations use a similar but larger scale approach to mount a "grass roots" campaign in proposing legislation with disappointing results. Unfortunately, the necessary steps to follow in dealing with legislatures are not always the obvious ones. Kimbrough (1964) has discussed this at length.

This paper represents an attempt to systematically identify the stages in the development of legislative proposals affecting schools. Special recognition is given to alternative sources of power in state government in contrast to the "formal institution-association" concept of power which is characterized by the assumptions that (a) the governmental institution controls the power of establishing public policy, (b) unofficial influence upon public policy comes primarily from formal interest groups and associations, and (c) basic policy is formulated as a result of interaction between legislators and formal interest groups (Kimbrough, 1964). While these assumptions are widely accepted, they do not always hold true in real situations. Specifically, in certain situations, citizen groups may have more power than one might expect. Other times a legislator, because of committee appointments, seniority, relationship to the press, or other characteristics, may have more real power than might ordinarily go with the job.

Educators interested in proposing legislation on the state level are faced with dealing with a highly political and not always visible structure. In Figure 1, major tasks or events have been organized into functions. These functions are named and listed in Table 1.

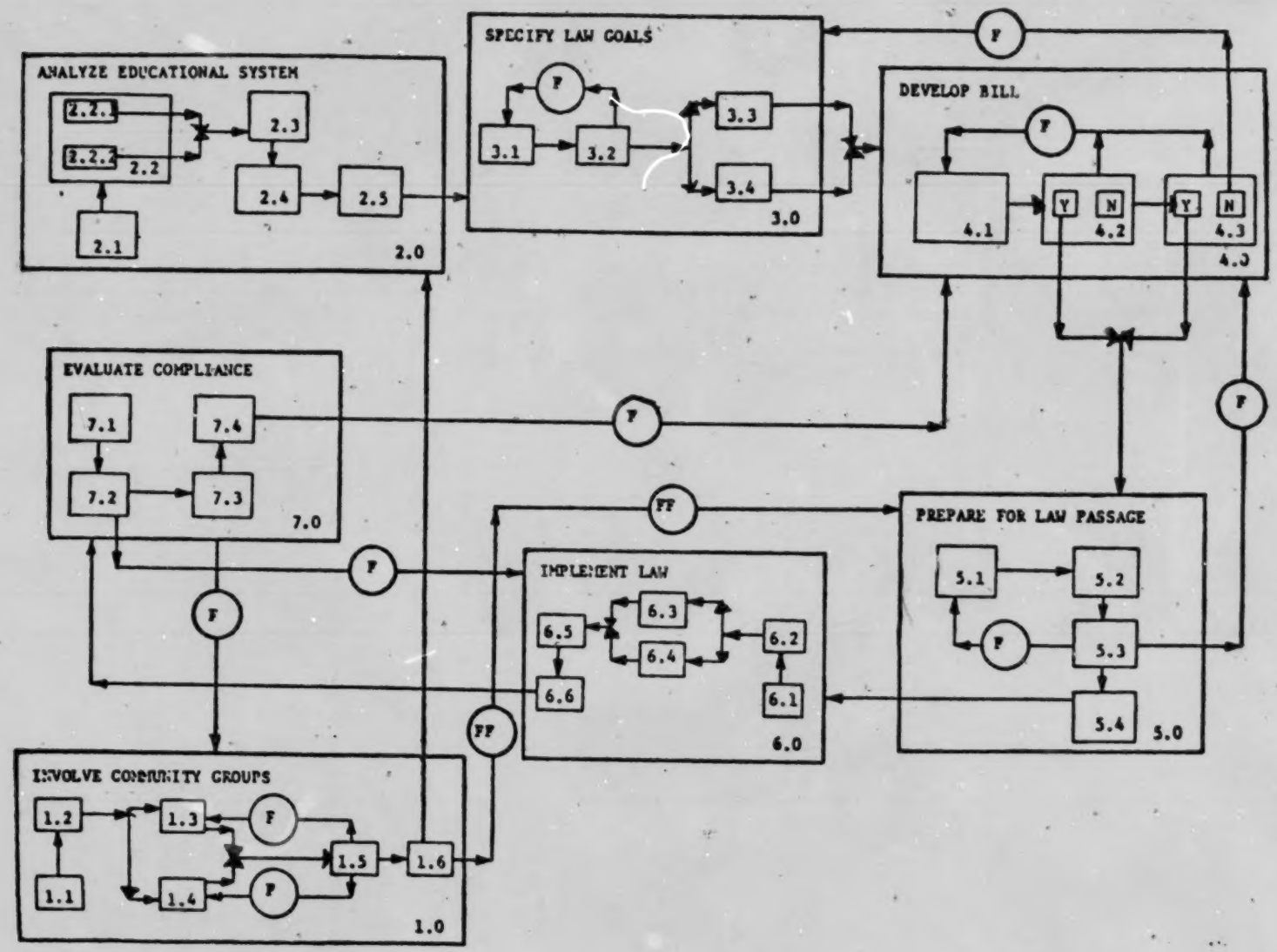

Figure 1. Interrelationships of functions and subsystems in the school law implementation system.

Table 1
Functions and Subsystems of the School Law Implementation System

1.0 INVOLVE COMMUNITY GROUPS	1.1	Recognize Emerging Need
	1.2	Obtain Community Involvement
	1.3	Analyze Special Interest Group
	1.4	Involve Political Groups
	1.5	Mediate Issues Among Groups
	1.6	Agree On Need For Law
2.0 ANALYZE EDUCATIONAL SYSTEM	2.1	Obtain Professional Consultant
	2.2	Assess Needs
	2.2.1	Assess Educational Needs
	2.2.2	Assess Community Needs
	2.3	Assess Human, Physical, Monetary Resources
	2.4	Analyze Possible Solutions
	2.5	Evaluate Present Laws
3.0 SPECIFY LAW GOALS	3.1	Perform Legislative Research
	3.2	Develop Guidelines/Outcomes
	3.3	Specify Funding Sources
	3.4	Specify Enforcement Authority
4.0 DEVELOP BILL	4.1	Obtain Legal Consultation
	4.2	Draft Bill
	4.3	Adopt Bill
5.0 PREPARE FOR LAW PASSAGE	5.1	Obtain Sponsors
	5.2	Lobby
	5.3	Compromise Positions
	5.4	Vote
6.0 IMPLEMENT LAW	6.1	Obtain Authorized Funds
	6.2	Establish Needed Staff
	6.3	Orient Recipient Agencies
	6.4	Publicize Law/Guidelines
	6.5	Develop Statutes
	6.6	Implement Law
7.0 EVALUATE COMPLIANCE	7.1	Collect Compliance Reports
	7.2	Evaluate Reports
	7.3	Prepare Legislative Reports
	7.4	Recommend Law Revisions

Generally, the functions have been numbered to reflect order. However, it may become necessary in practice to re-enter a function already passed, or skip one function and then return to it later. It is suspected that when a law is successfully passed by a state legislature and implemented, all of the events represented in this systems model have been considered at some time in the evolution of the legislation.

It is the plan of this paper to describe all of the functions in detail and give examples from the experiences of several states in the passage of legislation pertaining to special educational services. The numbers in parentheses in the text refer to subsystems in the model.

INVOLVE COMMUNITY GROUPS (1.0)

It would probably be incorrect to say that all school law is rooted in community support. Many aspects of school law were devised simply to facilitate maintenance and administration of school programs. Yet, it is probably safe to assume that most educational-related legislation reflects needs or conditions within the schools. The legislative proposal may not represent the best or most desirable solution to educational needs, but there probably are some reasons--financial, social, educational, or political--for the legislation to exist. Thus, the need for a change, innovation, or improvement must be evident from existing conditions at the local level (1.1). These needs may be recognized in various ways. For example, a deficiency may become obvious to professionals as they endeavor to provide services. Occasionally needs have emerged as a result of court cases. A specific example recently occurred in Pennsylvania where the courts considered the need for the State Department of Public Instruction to implement programs for the education of severely handicapped children, who, according to practices in the state, were excluded from attendance in public schools (Council for Exceptional Children, 1972).

Involvement of community members on the local level is desirable (1.2). However, a full-scale public relations campaign designed to make everyone in the community militantly in favor of the issues is neither feasible nor desirable. More specifically, local support from specific interested parties should be sought. For example, in matters of legislation concerning expansion of school programs, it probably would not be beneficial for proponents of the laws to seek support from retired members of the community. The latter, understandably, have been historically opposed to school legislation which would result in higher taxes upon their already burdened fixed-incomes. Selection of individuals, agencies, and community groups to become involved, write letters, campaign for passage, and provide expertise to interested parties in the community and in other ways support the proposed legislative changes would be desirable.

A good example of selective community activation is illustrated by efforts in Kentucky to establish improved special education programs in the state's public schools. The Kentucky Commission on Children and Youth resulted from the White House Conference on Children and Youth of 1970. A task force of professional educators and local volunteers was formed to assess the needs of Kentucky. In 1973 a state-level Delegate Assembly

was held as a forum for representatives from interested state organizations such as the PTA, Council for Exceptional Children, American Association for Children with Learning Disabilities, and the Kentucky Association of Retarded Children. This Delegate Assembly was organized to review the needs of the state and plan further action, including involvement at the community and state legislature levels.

During the early stages of developing legislative bills, the positions of various factions in the community toward the bill should be anticipated (1.3). For example, in the case of legislation permitting expanded special education services which would result in an increase in the tax base, the objections of senior citizens should be anticipanted. Also, professionals who work with handicapped children might be encouraged to support the proposal for increased services through their professional organizations, as well as individually.

Political groups are often organized with the purpose of giving impetus to pending legislation (1.4). Planning for their involvement should come early. However, due to the political nature of these groups, they should not be relied upon to carry a significant portion of the responsibility for tasks which must be accomplished. Furthermore, care should be exercised to keep the issue from turning into a political one. During initial stages, local political parties and special interest groups can provide helpful advice/guidance on dealing with state legislatures.

While in the beginning stages of working with special interest and political groups, efforts can be initiated toward mediating emerging conflicts among and within those groups (1.5). Mediating conflict at this stage will serve two important functions. First, it will bring opposing positions into the open while there is enough time to foster resolutions. Second, the availability of a forum for exploring alternative positions will serve to reduce problems later in the process.

The final goal of the involvement of community groups function (1.0) is to achieve general agreement that there is a need for the legislation (1.6). Through the discussions and meetings which were generated during the stages of the Community Involvement function, it might become apparent that the present legal structure is sufficient to meet the needs, and only changes or clarifications in implementing statutes or regulations are needed. On the other hand, it is possible that during these early stages, the need for specific legislation will become apparent.

ANALYZE EDUCATIONAL SYSTEM (2.0)

After organizing for action on the community level, the advice and opinions of professional consultants are useful in developing knowledge about the present situation in a variety of areas (2.1). For example, in attempting to pass school legislation to implement vocational programs for the handicapped, consultants from the legal, educational, social rehabilitation, and psychological professions can contribute to the broad base of knowledge necessary to thoroughly evaluate the needs of the educational system.

Needs assessment procedures should be developed integrating the contributions of the various professional and lay viewpoints, and needs assessments should be conducted (2.2). The information provided by the needs assessment will be crucial in formulating and implementing the legislative proposals. These needs assessment techniques should consider both educational (2.2.1) and community (2.2.2) needs regarding the problem.

When the nature of the needs are clearly understood, resources currently available should be investigated (2.3). Specifically, the availibility and training of persons with skills which will be necessary to implement the provisions of the proposed law should be considered. When a lack of availability of the necessary skill emerges, consideration should be given to the feasibility of training people, or attracting those already trained from other locations. In addition, other types of resources which must be evaluated in terms of established needs are funding sources, physical facilities such as special classrooms, special transportation needs, and area or space requirements. Information about availability of resources can contribute significantly to the molding of legislation.

Avenues of possible solutions should be explored next (2.4). This is based upon needs assessments, availability of resources, and other information gained earlier. Alternatives should be listed, and priorities of alternatives should be explored. Desirable as well as undesirable aspects ought to be considered at this level. Each solution might be further considered in view of the existing legal structure (2.5). Specifically, legislation already on the books might be worded so as to obstruct or conflict with some of the possible alternatives. Other existing laws might actually reinforce or support the legislation being proposed.

SPECIFY LAW GOALS (3.0)

In specifying goals for the proposed legislation, a task which will be called legislative research is recommended as the starting point (3.1). Legislative research refers to the gathering of legal references and information pertinent to the development of the bill. For example, it might be very useful to know how similar legislation has been approached in other states. Knowledge of any court decisions or prior legislation which might influence the selection of a specific course of action would be helpful. Many states offer a research service which performs this function for the members of the assembly. For example, in Kentucky, the Legislative Research Commission maintains a legal reference file, an index of legal bills and resolutions of previous sessions, and information about legislation in other states. In addition, the Commission helps legislators in drafting bills. Obtaining the services of such a legislative research group might offer sufficient motivation to contact a political party or legislator early in bill preparation activities.

Legislative research and the development of guidelines for the proposed legislation (3.2) can be mutually dependent. Thus, as guidelines

are developed, new areas of research might be suggested. For example, it may be very desirable for funding sources to be built into a school innovation--such as pre-school programs for children with developmental disabilities. A guideline or outcome for this legislation could be that funding sources should be included in the bill. This would necessitate further legislative research to insure legality, dependability, and appropriateness of the funding base. Thus, subsystems (3.1) and (3.2) are interdependent. The next two tasks, specify funding sources (3.3) and specify enforcement authority (3.4) complement each other, but are not mutually dependent. The bill will not be capable of implementation if some officer or representative of the state government is not responsible for its administration. Moreover, the bill would be non-functional if there were not adequate funds to support it. The importance of selection of administrative authority and specification of funding sources has been emphasized in an article by Bersoff (1971) pertaining to school psychological services.

DEVELOP BILL (4.0)

Each of the subsystems in developing a bill (4.0) have implications for the other subsystems in the function. That is, they are interdependent. Moreover, they are related to function (3.0) which deals with the specification of goals. It is suggested here that legal consultation be sought early in the development of the bill (4.1). Often such services will be available to legislators in the state assembly. If the group or individual who is proposing the legislation is working directly with a legislator, the services offered by the state might be utilized. Furthermore, some states have published guidelines for bill drafting which can reduce the amount of legal consultation needed; for example, the Bill Drafting Manual (Commonwealth of Kentucky, 1971). These guidelines can be helpful in describing such considerations as style, format, and language of bills. Their use will facilitate the consultant's work by allowing him or her to be more occupied with the legality, intent, and effectiveness of the proposed legislation, rather than style and format.

The second task in the development of the bill is the drafting of the bill (4.2). Initially, the bill should be drafted in rough form and circulated to obtain reactions from interested parties and professional and legal consultants. If it is acceptable, it can be prepared for passage; if not, it should undergo further legal scrutiny and be re-drafted. When no changes are recommended, the bill should be adopted by the proposing groups (4.3), and further circulated for consideration by interested parties and legal advisors. If it seems acceptable to all concerned, preparation for passage can begin. If it is unacceptable, the bill should remain in this function (4.2) until necessary changes are integrated into an acceptable bill.

PREPARE FOR LAW PASSAGE (5.0)

The fifth function is again an example of a series of subsystems which are interdependent. As the function is diagrammed in Figure 1,

the first subsystem involves the location of a sponsor for the bill in the legislative assembly (5.1). This should not be very difficult if political party support and legislative consultation was sought early in the implementation stage of the system.

In seeking a sponsor, one should look for a legislator who is sympathetic to the needs which prompted the proposal. To help with selection of a sponsor, the coordinator of this effort should consider voting records and special characteristics of the legislators. That is, a legislator with a retarded or otherwise handicapped child is likely to be sympathetic to supporting laws enabling provision of special educational services. Furthermore, consideration should be given to a legislator's responsibilities and position in the Assembly. If the legislator is only a member of the agriculture committee, it is probable that he or she will have less influence on the passage of an education bill than another who is chairperson of the education committee. Another factor to consider is the position and esteem a legislator holds with his or her colleagues. Such characteristics as seniority and political philosophy and alignment could further influence the kind of support a legislator would attract toward the bill in the assembly.

While searching for a sponsor, lobbying for the legislation should begin (5.2). Professional lobbyists who are familiar with the workings of the legislature can be hired to inform representatives of the need for passage of the bill. During the period that the proposed legislation is passing through various committees of the assembly, interested parties should be available to the committees for testimony in favor of the legislation. If the community had been involved earlier, pressure from organized groups can be placed upon legislators at this time. One state has reported that letter writing campaigns and visits to state legislators by the public, along with statistics and other facts made public by professional educators provided sufficient impetus for passage of much needed special education legislation (Russell, 1973).

During the course of preparing a bill for passage, information from the community (1.0), legal consultants (4.1), and professional consultants (2.1) who have been participating in earlier functions may need to be integrated and reconciled with emerging political issues. Such a situation can result in a necessity for suggesting compromise positions on certain issues. For example, if one is interested in legislation designed to upgrade standards of teacher certification, opposition will come from teachers already certified who would not meet the new standards. Thus, a "grandfather clause" might be a satisfactory compromise. These compromises should not be made impulsively. Rather they should be investigated by re-entering subsystems of the (4.0) function until a satisfactory compromise adjustment to the needed legislation is effected which would not weaken the bill. The bill's sponsor should, of course, be included in these deliberations.

The final subsystems of the fifth function is the vote. While there is little that can be done to support the bill during the actual response to a call for a vote, proponents of the legislation may find a need to

continue the lobbying and public pressure until the bill is actually voted upon. This is because even with all the work done so far, it is possible that interest will begin to dissipate before a vote and the issue could die without being put on the legislative agenda.

IMPLEMENT LAW (6.0)

Passage of a bill does not insure implementation of it. Earlier in the model (3.4) it was indicated that a responsible unit should be established within the state governmental structure for implementation. Generally one can expect education-related legislation to be administered by the state department of education. In addition to an office responsible for getting initial compliance activity begun, the law must be supported with the necessary funding structure (6.1), and the needed staff (6.2). On the national level, for example, the problems of the National Institute of Education have been traced to problems in the areas of adequacy of funding and staffing (Stivers, 1973).

Much of what has been done previously to get the bill passed must be repeated with the responsible governmental agencies as the target (6.3). Specifically, it would be unrealistic to expect a state department of education to have a core of enlightened workers on its staff in virtually every area of education for which laws are passed during a legislative session. Moreover, it has been recognized that the state superintendent of public instruction might be the single most important force in determining the effectiveness of legislation (Fifield, 1967). Thus, educating the top administrator and staff to the issues is an important task for those who supported legislation earlier.

Another important subsystem which occurs simultaneously to (6.3) is publicizing the provisions of the new law (6.4). Here the news services and other communications media might be utilized. Furthermore, sending professional educators who are interested in the legislation to provide lectures and workshops for community groups would facilitate publicity of the law. In addition, some groups in the past have set up an information office with toll-free number which may be called by parties seeking information.

These two subsystems, (6.3) and (6.4), contribute to the development of administrative statutes or regulations (6.5) which will determine the manner of implementation of the law. This is an especially important phase of school law. Consider the example of a state which passed legislation authorizing placement of children with certain types of learning problems into resource room programs. The administrative statutes pertaining to the law determine how children with learning problems will be identified, and how the resource rooms operate. Furthermore, the qualifications of personnel who operate resource rooms are delineated in the administrative regulations. Moreover, such pragmatic concerns as availability of types of materials, length of time a child may stay in the resource room setting, and nature and frequency of re-evaluation may be stipulated in governing regulations. Thus, the implementation of services

as a result of legislation is profoundly affected by the administrative regulations. By active interest and pressure applied to officials charged with implementation, those who proposed the legislation can have an impact upon the speed and quality of the application and administration of the new law.

EVALUATE COMPLIANCE (7.0)

The effectiveness of the new legislation is the final test of all the previous efforts. Evaluation procedures designed to determine whether the objectives of the legislation are being met should be built into administrative regulations. Governmental agencies may periodically publish, or otherwise make available to the public, reports of studies of compliance. Other data which might be available include achievement test scores, reports of projects, and court actions. Groups interested in particular legislation must continue to monitor the effectiveness of the legislation and associated administrative statutes for some time after the legislation is passed to insure the objectives are being met (7.1). When information from the state department of education is not forthcoming, formal and informal studies should be completed to evaluate the effectiveness of the laws. When the appropriate data are available, they should be analyzed by qualified personnel (7.2). Reports of these evaluations should be prepared (7.3). These reports might be used to serve as a basis for further legislative action (7.4).

Legislative change is important to those interested in improvement of special education services at the state level. The functions outlined here have been identified as important in the eventual passage of legislation. Their utilization does not have to be sequential; not has one function been identified as more crucial than another. The attitude taken in writing this paper has been that people who work outside of government will be proposing legislation. More than likely, people associated with government in varying degrees--legislators, agency personnel, administrators--will be proposing legislation. One's position with respect to the governmental structure might cause a difference in where the model is entered. Furthermore, local considerations, for example, bicameral state assemblies, lobbying restrictions, and length of legislative session might influence certain functions in the model. However, regardless of where the system is begun, it is felt that most proposed legislation in education for which there is no initial organized support will not be successful. Adherence to these processes as they have been described, with adjustment to one's specific situation, should increase the chances of success in dealing with the legislative process.

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THE MOD PROJECT:

A MODEL PROJECT FOR COOPERATIVE DISSEMINATION/UTILIZATION OF PROMISING PRODUCTS/PROGRAMS

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This project was designed to determine the process by which an Intermediate State Agency (ISA), utilizing basic dissemination techniques, might become a linking agent between developers of proven educational products/programs and the classroom practitioner. The need to (a) create awareness, (b) aid in implementation, and (c) encourage replication by Local Education Agencies (LEA) based on an optional but highly recommended diagnosis of local needs are addressed by this project.

A delimma facing both the national Research and Development Centers and the LEA's is the process involved in linking successful products/programs that have been developed and the practitioner in the classroom. Experience has shown that educators are receptive to the utilization of promising products/programs if:

1. They know about the product and its purpose.

2. It can be demonstrated that the product answers a need generated by their particular situation.

3. Orientation and training in its use are available.

4. Funds can be generated to purchase and install the product/program.

5. The product/program has been cleared for use and/or is supported by the various regulatory agencies in their state and district.

In an effort to respond to this need, the MOD Project offered to LEA's, within the ISA geographic area of responsibility, the opportunity to utilize selected products/programs.

The methodology used in the development of this model includes five major areas: (a) Product/Program Selection, (b) Awareness, (c) Implementation, (d) Replication, and (e) Diagnosis of Needs. The Product/Program Selection procedures encompass a rationale for selection, a basis for product/program selection, sources of information, and a basis for product/program implementation. Awareness development includes a rationale for LEA receptivity and methodology. Implementation incorporates LEA/ISA commitment, ISA materials acquisition, training of LEA personnel, ISA

continuing support to LEA's, and evaluation. The Diagnosis of Needs addresses evaluation of services provided LEA's by ISA, assessment of national needs and analysis of needs assessment by an independent agency which the LEA might solicit. Finally, Replication encourages and supports visitation and/or other forms of advertisement for successful pilot programs.

The data collected relative to the three major aspects of dissemination are as follows:

1. Awareness -- pre/post testing of "County-Wide Awareness Conference" participants. Utilizing the Student t technique and the .05 level for acceptance, a significant difference was obtained for each county. Figure 1 graphically illustrates the summary of mean score gains.

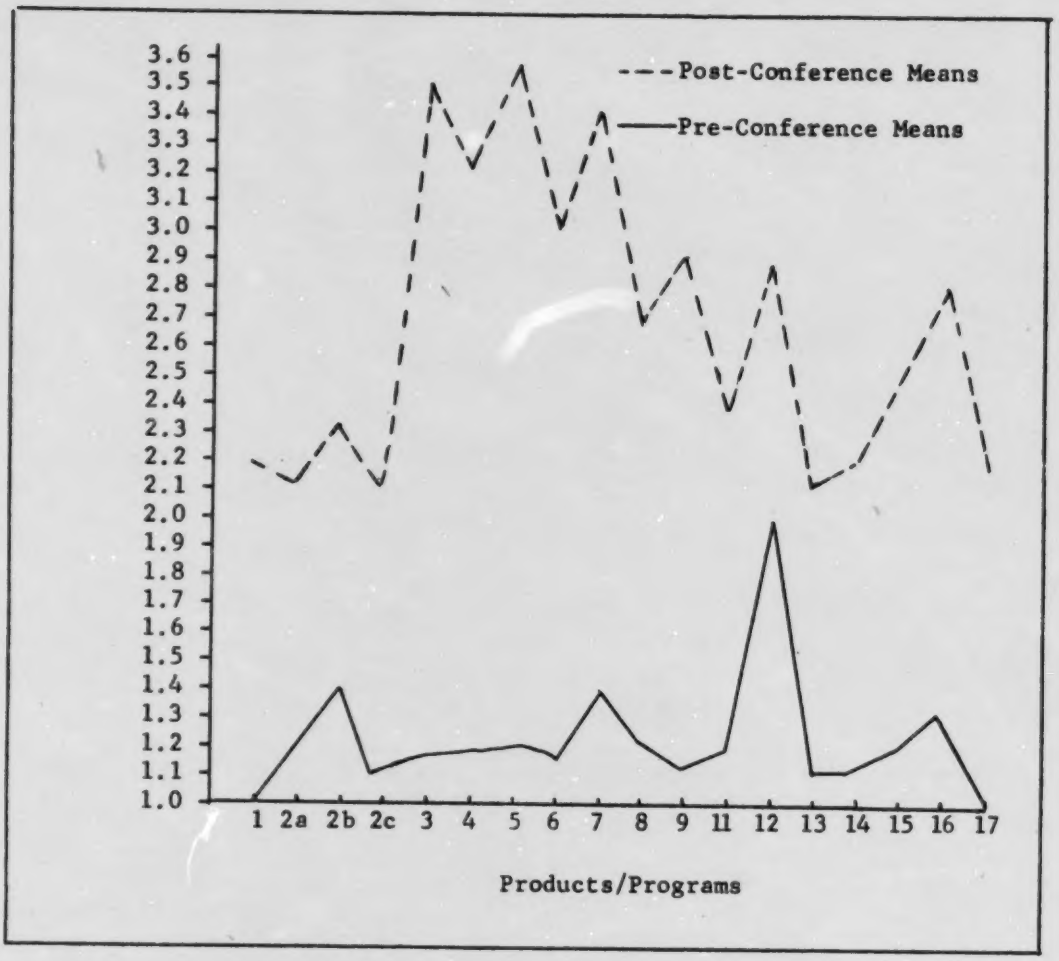

Figure 1. A comparison of countywide awareness conferences Pre/post summaries for each product/program

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2. Implementation -- program requests and records from teacher-training sessions. Table 1 lists the products/programs implemented by counties.

Table 1
Implementation of Products/Programs
by Counties*

Product/ Program	Collin			Dallas			Ellis			Fannin			Grayson			Hunt			Kaufman			Rockwall			Private			Totals		
	ISD	T	P	ISD	T	P	ISD	T	P	ISD	T	P	ISD	T	P	ISD	T	P	ISD	T	P	ISD	T	P	ISD	T	P	ISD	T	P
1.				2	13	325																			3	14	350	5	27	675
2a.				1	1	N.A.				1	1	N.A.																2	2	N.A.
2b.							1	1	N.A.																1	2	N.A.	2	3	N.A.
2c.	1	1	N.A.	1	1	N.A.							1	1	N.A.										1	1	N.A.	4	4	N.A.
3.				3	33	825	1	12	300				1	4	100							1	5	125	4	13	325	10	67	1675
4.	1	7	175	1	2	50	1	20	500				1	23	575				1	3	75	2	9	225	1	4	100	8	48	1200
5.				3	13	325							2	31	775													7	61	1525
6.	3	34	850	3	64	1650	3	56	1400	1	14	350	1	9	225	1	13	325										12	195	4875
7.	1	1	25	2	2	50	3	3	75	1	3	75	2	6	150										1	3	75	15	23	575
8.	1	3	75	2	5	125	2	9	225													1	1	25	3	7	175	9	29	725
9.	1	13	325	9	179	4475				1	9	225				1	8	200	1	1	25	1	2	50				7	20	500
10.	----------			----------			----------			----------			----------			----------			3	103	2625				2	96	2400	14	410	10250
11.				1	3	75				1	1	25																		
12.	1	3	75	3	7	175	1	3	75																1	3	25	3	9	225
13.	----------			----------			----------			----------			----------			----------			----------			----------			----------			5	13	325
14.	1	1	25	2	6	150	1	2	50				1	1	25															
15.				1	5	125	2	3	75										1	2	50				1	1	25	7	13	325
16.							2	3	75																			3	8	200
17.	1	1	25	1	1	25	1	1	25										1	6	150							3	9	225
																			1	1	25							4	4	100
Totals	13	64	1575	32	337	8375	18	113	2800	5	30	675	9	48	1850		21	525	8	116	2950	5	17	425	23	160	3900	113	826	21575

e. Replication -- written documentation as evidence of other LEA's interest relative to implementation within their schools of successful products/programs utilized in their geographic area. Table 2 indicates the number of products/programs that have been replicated by school districts to date.

Table 2

Products/Programs Replicated by ISD's

Product/ Program	Number of ISD's	Number of Schools	Number of Teachers	Projected Student Involvement
3.	2	2	6	150
4.	1	16	64	1600
5.	3	3	21	525
6.	3	72	250	6250
7.	5	5	8	200
8.	1	3	6	150
Totals	15	101	355	8875

*See pages 47 and 48 for a listing of Products/Programs.

This model, as evidenced by the data, has proven to be a successful model of dissemination. This is further evidenced by the project being validated as an exemplary ESEA Title III Project, Spring 1974.

The need for a process or vehicle which provides a connection between developer and user has long been a major factor in product/program marketing. Business and industry budget millions of dollars annually to tell the consumer about a "better" toothpaste or detergent. However, consumers of educational materials are told little about available products/programs other than commercially available offerings. Much educationally-sound research and product/program development goes unnoticed each year for many reasons, but perhaps the greatest reason is that in order to implement a program, the implementor--the classroom teacher--must be made aware, must be shown how promising products/programs can be implemented, and must be assured that replication of successful programs can be made available for their classrooms. The product of the educational process is long in reaching full development and there are no panaceas for acquisition of knowledge, development of wisdom, or positive experiences in school. Many alternatives must be examined for all children are individuals and must be taught as individuals. A process to inform the classroom teacher of new alternatives for teaching is of the highest priority--MOD is one attempt at that process.

Listing of Products/Programs

1. Aesthetic Education Program, developed by CEMREL, Inc., St. Louis, Missouri.

2. Information Units:
   a. Elementary Science Information Unit,
   b. Early Childhood Information Unit,
   c. American Government Information Unit, developed by Far West Laboratory for Educational Research and Development, San Francisco, California.

3. Ripples, developed by National Center for School and College Television, Bloomington, Indiana.

4. Inside/Out, developed by National Center for School and College Television, Bloomington, Indiana.

5. Images and Things, developed by National Center for School and College Television, Bloomington, Indiana.

6. Programmed Tutoring in Reading, developed by Eberson Enterprises, Pasadena, California.

7. Parent/Child Toy Lending Library, developed by Far West Laboratory for Educational Research and Development, San Francisco, California.

8. Comprehensive School Mathematics Program, developed by CEMREL, Inc., St. Louis, Missouri.

9. Classroom and Instructional Management, developed by CEMREL, Inc., St. Louis, Missouri.

10. Individualized Spelling and Writing Patterns, developed by Research for Better Schools, Inc., Philadelphia, Pennsylvania.

11. Leadership Laboratory for Student Development, developed by Thiokol Chemical Corporation, Ogden, Utah.

12. Reading Materials for Classrooms Based on Sesame St./The Electric Company, developed by Children's Television Workshop/Addison-Wesley Publishers, New York, New York/Menlo Park, California.

13. Research Utilizing Problem Solving, developed by Northwest Regional Educational Laboratory, Portland, Oregon.

14. Interaction Laboratory for Teacher Development, developed by Thiokol Chemical Corporation, Ogden, Utah.

15. Focus on Self-Development, developed by Science Research Associates, Chicago, Illinois.

16. Developing Understanding of Self and Others, developed by American Guidance Service, Inc., Circle Pines, Minnesota.

17. Action Laboratory for Achievement Motivation, developed by Thiokol Chemical Corporation, Ogden, Utah.

A SYSTEMS VIEW OF LEARNING FOCUSED EDUCATION

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A Definition of Learning Focused Education

Learning Focused Education (LFE) is an issue of both substance and form. A definition is proposed here by:

1. highlighting a key organizing concept (substance) that has led to the notion of LFE;

2. formulating a definition around a set of variables that can display the way LFE is organized (form); and

3. contrasting LFE with other ways of organizing education.

A Key Organizing Concept

It is instruction and learning that is, or should be, in the center of education. A conception of instruction and learning thus becomes the key organizing concept of education.

Two contrasting modes of instruction and learning can be proposed: Mode A and Mode B (Banathy & Lange, 1972). Mode A is depicted in Figure 1.

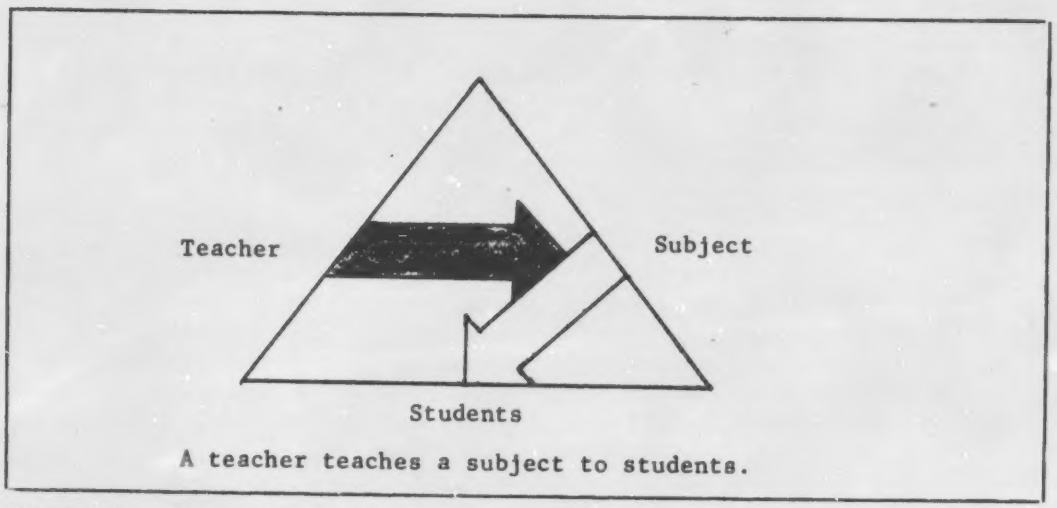


Figure 1. The model of instructional Mode A.

It has already been suggested that in this mode the teacher appears to be the actor on the instructional scene. The environment is organized in order to optimize his performance. Aids, if used, are introduced to enhance teaching. Students are the audience and are expected to pay attention to the performance of the teacher. The subject can be anything to which the teacher can address himself and which students may be required to study. The size of the student group is usually limited by the size of the instructional space and the teacher's capability to control the group. It has been often remarked that if Mode A is realized, the instructional performance may be accomplished even without the presence of students. Thus, according to Mode A, the key activity is: Teacher teaches subject. In Figure 1, the shading of the arrow leading from the teacher to subject indicates this dominance.

Now, let's examine a model representing Program B (Figure 2).

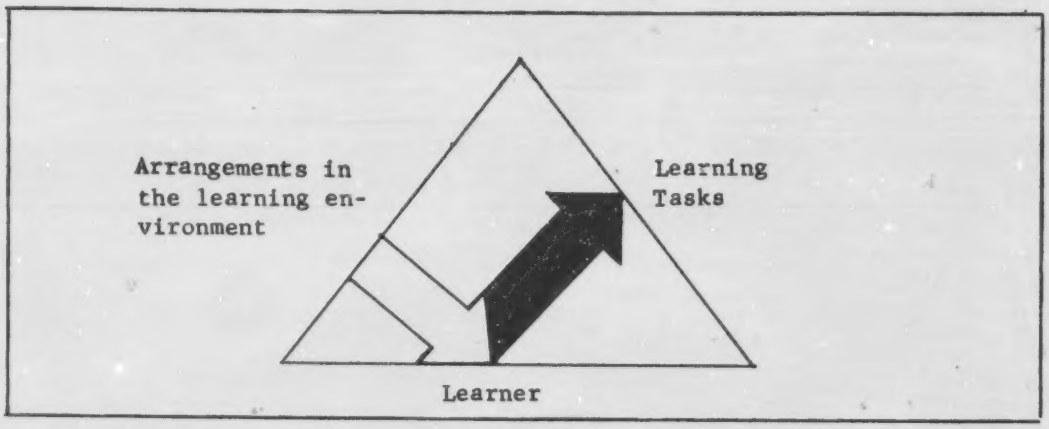


Figure 2. A model of instructional Mode B.

Arrangements are made in the environment of the learner which communicate the learning task to the learner so that he can explore and master it. Learning tasks are knowledge, skills, and attitudes which the learner is to acquire in order to be able to perform in the way desired or proposed.[1]

In Mode B, the singular form learner is used. In this model, it is the learner who is the actor on the instructional scene. Arrangements are made around him in order to facilitate his mastering of the learning task. The concept of arrangements may stand for many things: selection and organization of content which (best) represents the learning task; selection and organization of learning experiences by which the learner is confronted with the content; management and motivation of the learner; assessment of the progress the learner makes; selection of components which take part in the arrangements; and scheduling. In an extreme form of Mode B, all these things can be done by the learner himself.

The key activity in Mode B is that the learner masters the learning task. In Figure 2, the shading of the arrow indicates the centrality of

this interaction.

Model A represents the traditional, conventional instructional mode. This mode still prevails in education today. However, whenever we have been seriously interested in helping students attain specific performances, such as in athletics or team sports, we have managed to operate in a learning or performance centered mode.

Model B appears to be an important current, emerging pattern when one examines professional statements and innovative projects reported in the literature. It is perhaps obvious that the tone of the preceding paragraphs indicates a penchant for Model B. But such a preference or even commitment does not intend to promote a dichotomy between learning and instruction. The significance of instruction is not questioned here at all. The point made is that the learning task is the nucleus around which instruction is to be designed. The role and function of instruction should be viewed in its proper relationship to learning. This relationship should be planned and provided for accordingly. Instruction is a means to an end and not an end in itself. Its function is to facilitate learning. Although in theory this statement may be widely acclaimed, it is seldom practiced. If learning were truly in focus, no one would set up classes with 30 to 40 students in them for five to six periods a day, and conduct them within a rigidly set time schedule. Neither could one seriously suggest that this many students can learn the same way during the same amount of time, or for that matter, learn much at all in such a setting.

A Definition of Learner Centered Education (LCE)

A systems view projects education as a complex of systems operating at three levels: (a) the institutional level, (b) the instructional level, and (c) the learning experience level. In the analysis presented here it will be seen that three interdependent systems also operate at these same levels--the school system, at the institutional level; the instructional system, at the instructional level; and the learner system, at the learning experience level. Depending upon the choice made in designating one of these three levels as the primary system level, three distinctively different operational models of education emerge. If the educational experience is the primary level, then the system complex is built around and responds to the learners' systems. The instructional system provides information about resources and makes arrangements for the use of resources that facilitate learning. The institution provides facilities and financial resources for the support of the instructional/learner systems. This image projects a rather open educational system. Decisions relevant to the educational experiences are made primarily by the learner. Within an educational institution there are as many organized learner systems as learners. Furthermore, the boundaries of the learners' systems are usually extended beyond those of the school.

If the learning experience (level) is the primary level, the overall purpose is to accommodate the specific learning goals, needs, and interest of the individual learner. In this situation, learner objectives

are defined through interaction between the learner himself and the instructional staff. The resources system, supporting instruction and learning, is wide in scope and is of the greatest variety in kind. The system embraces much of the environment; its boundaries extend into a much wider territory than that of the institution alone. Constraints of this system are chiefly those emanating from the context of the learning environment and from funds available to meet operational requirements. Decisions are shared with the learner who interacts with the instructional staff. Furthermore, decisions are responsive and sensitive to the specific learning context.

The above definition of Learning Focused Education (LFE) can be reinforced by briefly identifying two other organizational arrangements that contrast with LFE.

If the institutional level is the primary level, education is organized around a dominating institutional level. This is the case in societies in which authority is highly centralized, e.g., where there is a uniform national or state system of education; or in the case of local control where educational and curricular decisions are made at the top level. The instructional and learning experience levels are subordinated to the institutional level. The purpose of the instructional system is to provide teaching based on prescribed texts and following a preset schedule. The learner is expected to attend classes and respond to instructions. This approach implies a rather closed educational system in which decisions are being made far removed from the learner, and external influences are regulated by top decision-makers. An educational institution represented by this model would operationalize a uniform curriculum and educational experience.

If the instructional level is the primary level, the requirements of the instructional system govern the systems complex. There is an interacting relationship between the institutional and instructional levels, and the institution is concerned with providing facilities and financial resources support to the instructional system. The learning experience level is subordinated to the instructional level. The instructional system manager is the key decision-maker. The learner is expected to perform on certain instructional objectives. Compared to the institutional level organization, described above: (a) this approach implies a system which is more open (than the one described) to external influences, (b) it has a larger resource base, (c) educational decisions are made closer to the learner, thus (d) it is more responsive to the learner. Consequently, within a specific educational institution, a variety of instructional systems may be operationalized. Any given instructional system, however, is rather closed.

Factors That Give Rise to Learning Focused Education

The interest in learning focused education has been with us for a long time. Factors that have caused the emergence and strengthening of such interest have increased in number and intensity to the point that today their cumulative effect has created a strong movement in education.

Some of these factors relate to (a) a better understanding of the learner and learning, (b) a thrust to improve education, (c) a shift in educational purposes and priorities, and (d) the emergence of a systems view of education.

Factors related to a better understanding of the learner and learning include a recognition of:

1. individual differences and a willingness to operationalize this recognition by creating alternatives that consider differences in learning rate, style, mode, and content;

2. differences related to cultural pluralism, and individual interests and needs;

3. the value inherent in the uniqueness of the individual and the strengthening and full development of such uniqueness.

A thrust to improve education has its roots in the realization of inadequacy of education outcomes resulting in a dissatisfaction with what schools are doing and how they are doing it. Reflecting upon such inadequacy, numerous statements have been made by many authoritative sources. In a recent U.S. Office of Education Policy Paper, Kenneth Hoyt elaborated upon conditions calling for educational reform. A shortened version of his statement, which included the following, is presented:

1. Too many persons leaving our educational system are deficient in the basic academic skills and fail to see meaningful relationships between what they are being asked to learn in school and what they will do when they leave the educational system.

2. American education, as currently structured, best meets the educational needs of persons who will someday become college graduates.

3. American education has not kept pace with the rapidity of change in the post-industrial occupational society.

4. Too many persons leave our educational system at both the secondary and collegiate levels unequipped with the skills or attitudes that are essential for making a successful transition from school to work.

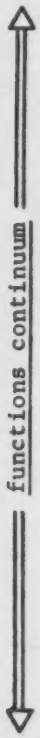
5. The growing need for and presence of women in the work force and continuing and recurrent education on the part of adults are not being adequately met by our current systems of public education.

6. Insufficient attention is given to learning opportunities outside the structure of formal education.

7. The general public has not been given an adequate role in formulation of educational policy.

8. American education does not adequately meet the needs of minority or economically disadvantaged persons.

A shift in educational purposes and priorities may be recognized by examining major functions that education may address. A list of such functions (Banathy, 1975) include:



- the custodial function (take care of students while they are in school).
- inculcate values and mores inherent in the culture, develop understanding of the world in which the individual lives.
- transmit information and knowledge (develop knowledge and understanding of humanities, arts and sciences).
- develop effective communication skills.
- develop cognitive skills, sharpen analytic skills.
- develop occupational competence.
- develop problem solving skills and other life skills/habits.
- develop facility in making independent value judgments and independent decisions.
- develop understanding of the relationship of the individual and the environment.
- develop facility for social interaction (skills).
- facilitate the (unique) self-development of the individual.

The functions of certification/selection can be added to the list above.

Based on their orientation and/or requirements, different societies and communities assign different order of priorities to these functions. A variance in the order of priorities is also evident if education is viewed through time. Most importantly, differences in the order of priorities indicate different structures or organizational schemes of education.

The prevailing classroom-based structure and its organizational scheme of education were most appropriate for responding to the mass-instructional assembly-line thrust of the early 20th century industrial society and its "melting-pot" orientation. It emphasized the top half of the functions on the continuum (see above). Those may be labeled as the more traditional functions of education. More specifically, priority functions included custodial function; the key functions of enculturation, namely transmission of information/knowledge and inculcation of a common set of values and mores; development of cognitive skills, and, to some extent, vocational skills. Obviously, the classroom-based structure has proved to be less than adequate to cope with the development of life skills and social skills, problem solving and decision-making, and it basically counteracts the uniqueness focused thrust and emphasis on the self-development of the individual.

The post-World War II emergence of the technological society in this country--and in others--had created a new order of priorities of educational functions. Next to information/knowledge acquisition, skill development became of high premium, possibly in the priority order of cognitive, occupational, and life skills. To accommodate such new order of priorities, variations in the classroom-based structure have introduced new arrangements, based on a media-oriented educational technology. This media-oriented educational thrust has experienced--and is experiencing--increasingly more difficulty to attend to cultural pluralism, thrust for individualization, diversification of life-styles, and facilitating independent value judgment and decision-making. The post-technological era--if we may so call the emerging period--appears to extend its functions and priorities into the facilitation of the unique self-development of the individual through life-long learning, the development of social skills in addition to the development of life and cognitive skills, and occupational, avocational, and leisure skills. The context of this emerging model of education is a pluralistic society with a wide range of life-styles, and operating based on highly diversified value systems. The shift in functions resulted in a search for new structures and organizational schemes, more specifically to a reinforcement of the concept of learning focused education.

The emergence of a system's view of education has led us to recognize another set of factors that support learning-focused education. Systems thinking leads us to: (a) identify the functions of the system in response to which to design it, (b) build systems structure in view of functions that the system is to attend to, (c) designate the key entity around which to organize the system, (d) specify the various systems levels, (e) and the outcomes expected to be produced by systems operating at those levels, and (f) design the interface and interaction between the component systems.

Following the kind of thinking implied by the aspects mentioned above, we (a) shall consider the facilitation of learning as the central function of education, and consequently, will (b) build a system structure with appropriate components which will implement this function (See Figure 3), (c) designate the learner as the key entity of the system, rather than the teacher, (d) specify the institutional, instructional, and learning experience levels as the appropriate systems levels, and (e) formulate outcome models that can be implemented at these levels. We shall recognize, for example, that the instructional level cannot produce learners who have learned, but only arrangements that can facilitate learning. Finally, we have understood that school systems are social systems and they are, therefore, open systems and are not to be viewed with closed systems models in mind. For years, during the first period of the systems approach movement in education, we have often applied to education some of the closed systems models coming from engineering and other fields of application where closed systems models are viable.

We have reviewed several clusters of factors that seem to provide rationale for learning focused education. What is important to understand is that it is the total interactive or synergic impact of all these factors that should be viewed as giving viable support to learning focused education.

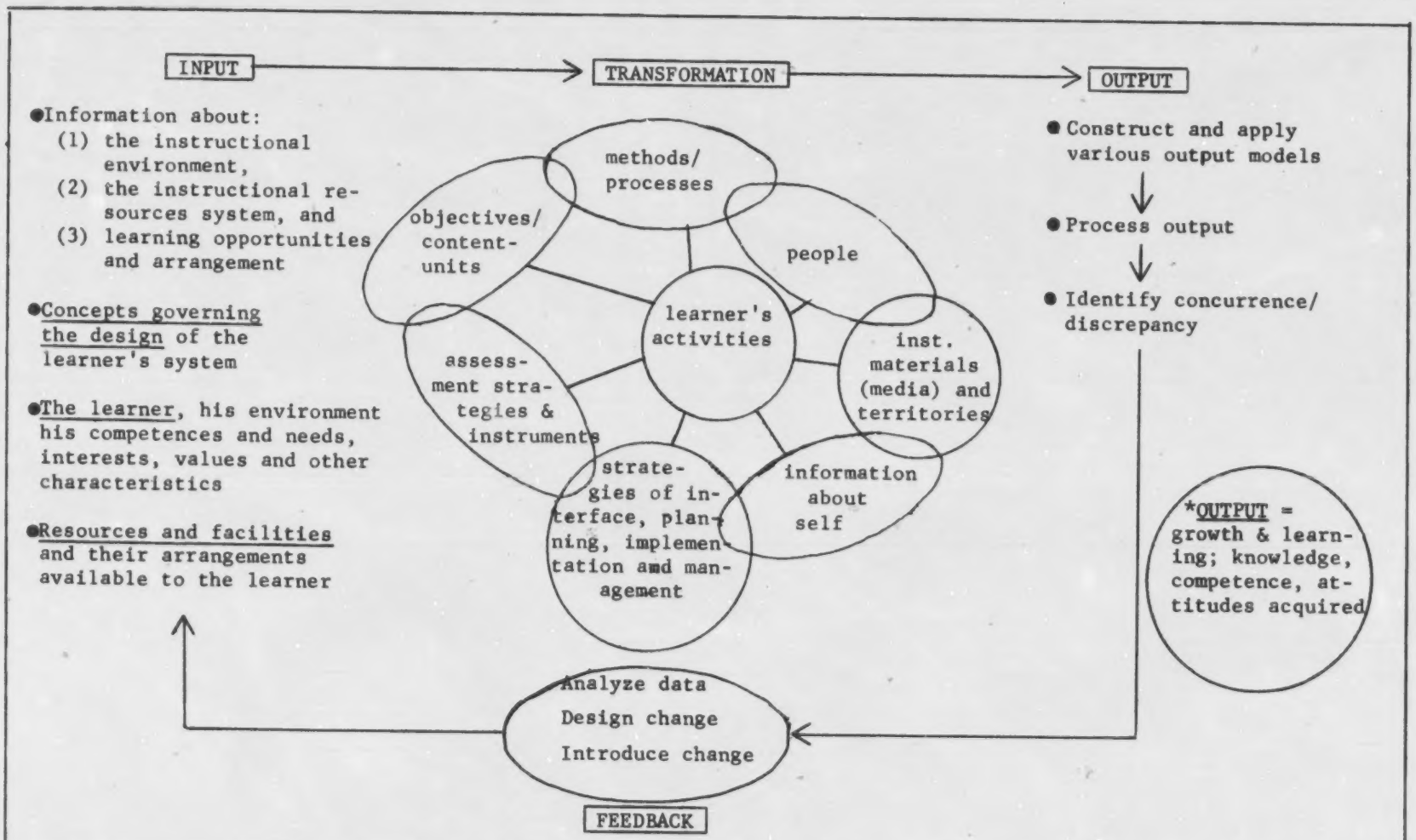

INPUT
TRANSFORMATION
OUTPUT
●Information about:
(1) the instructional environment,
(2) the instructional resources system, and
(3) learning opportunities and arrangement
●Concepts governing the design of the learner's system
●The learner, his environment his competences and needs, interests, values and other characteristics
●Resources and facilities and their arrangements available to the learner
methods/ processes
objectives/ content-units
people
learner's activities
assessment strategies & instruments
inst. materials (media) and territories
strategies of interface, planning, implementation and management
information about self
● Construct and apply various output models
● Process output
● Identify concurrence/ discrepancy
*OUTPUT = growth & learning; knowledge, competence, attitudes acquired
Analyze data
Design change
Introduce change
FEEDBACK

Figure 3. The learner's system: A process model (Adapted from "An Application of Systems Models in Education," a paper presented at the Conference on Cybernetic Models and Adaptive Organizations, August 1973, Porto, Portugal).

A Model for Learning Focused Education

A model for LFE is introduced here by displaying an image of the systems complex of LFE and then elaborating on the systems operating at the learning experience level.

An Image of the Systems Complex

Figure 4 presents the image of the systems complex.

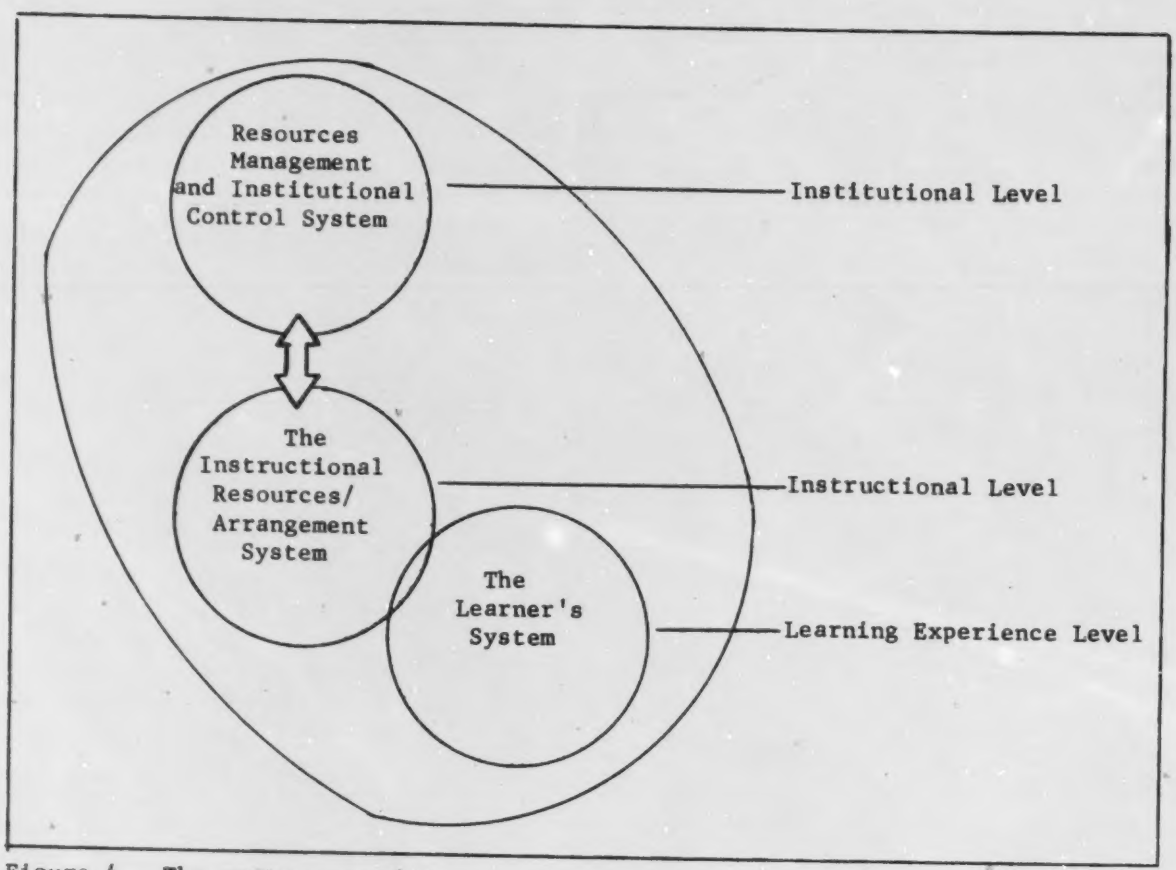


Figure 4. The systems complex.

The Resources Management and Institutional Control System (a) interacts with the society and defines general educational needs and requirements, (b) develops resources and resource support to the instructional and learner system, (c) allocates resources and monitors their use, and (d) establishes policies and rules for the operation of the institution and oversees the operation.

The Instructional Resources System provides learning opportunities and relevant resources to the learner. It presents (a) a curriculum structure attending to the selected general educational goals and specific learner's goals, (b) a description of goal-relevant content alternatives and alternative methods and procedures by which the content can be communicated to the learner, (c) alternative activities and arrangements by which the learner can acquire competence, and (d) an information system which provides easy access to information on all the above items and on people, materials and media, facilities available to the learner.

An Image of the Learner's System

Learner's Systems are organized in the learning experience levels and they provide structure, operational arrangement, and resources by which the learner's activities can be planned, programmed, implemented, and monitored. The purpose of the learner's system--at the micro level--is to enhance the mastery of specific learning tasks and--at the macro level--to facilitate the individual's becoming the kind of person he or she has the potential and desire to become. The key entity of the system is learning and the primary decision-maker is the learner. The activity of the learner is built on the basis of information available from the instructional resources system, which provides opportunities for learning experiences. Purposeful activities brought together, sequenced, and integrated, become the learner's program. The learner always knows (a) what activities he or she is--and will be--involved in, (b) why, (c) where the program trail leads, (d) how far he or she has gone at any given time, and (e) what else he or she has to do to make further progress toward learning goals. The output or product of the learner system is personal growth and knowledge, competences, attitudes, and values that the student has acquired.

References

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Banathy, B. H., & Lange, D. L. A design for foreign language curriculum. Lexington, Massachusetts: D. C. Heath & Co., 1972.

Footnote

[1]This proposed way of learning is described in objectives which specify the behavior which the learner is to attain as an outcomes of his learning.

A MODEL FOR IMPLEMENTING A CAREER EDUCATION SYSTEM

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Elements in a Career Education Delivery System

Career education refers to the process of systematically providing experiences of awareness, exploration, and preparation, together with placement and follow-up activities, to facilitate and contribute to the optimum development of the individual with implementation of the person's occupational roles in a healthy self-concept. A system is an organization or structure of an orderly whole made up of interacting and interrelated elements or functions working together for the purpose of accomplishing a predetermined mission (Ryan, 1974). Three major functions must be carried out in the process of providing career education to any group of individuals, regardless of setting. These functions, constituting the necessary elements for delivery of career education, are: planning, implementation, and evaluation.

Planning is concerned with assessing needs, articulating goals, subgoals, and objectives, producing possible strategies for achieving the performance objectives, evaluating the alternatives, and selecting the best possible strategy. In planning career education, analysis of the environment is made and a model is synthesized and simulated. Implementation "is the actual doing of what was planned, using the selected tools and strategies" (Kaufman, 1972, p. 134). In the career education delivery system, the implementation stage begins with the establishment of "preconditions required for the new concepts to gain a footing" (Hoyt, Evans, Mackin, and Mangum, 1974, p. 188), and this involves seeing that a climate of readiness and support is established and maintained, as well as developing or obtaining equipment and materials, training personnel, arranging facilities, scheduling time, and providing needed finances. Implementation also involves the tryout of the various components of the system, as well as testing the completed prototype before the total system is launched and maintained. Evaluation is the third function of the career education delivery system. Evaluation is concerned with determining how well the assessed needs have been met, and establishing the effectiveness of the system in achieving the performance objectives. Both formative and summative evaluations must be carried out. Variables are defined, effectiveness criteria are established, measurements taken, and results are interpreted and reported.

This paper is addressed primarily to the implementation of career education. However, due to the interrelatedness of planning, implementation, and evaluation in the actual provision of career education in the real-life situation, consideration will be given to planning and evaluating activities which most directly relate to implementation.

Relation of Implementation to Planning and Evaluation

Each function in the system can be identified and separated into its component parts, and the relationships within and between the major functions can be determined. A model depicting the three major functions to be carried out in delivering career education, and the interrelatedness of these functions, is shown in Figure 1.

Inspection of the model in Figure 1 shows that each of the three major functions is comprised of three subsystems. Producing a model involves analysis of the real-life environment (1.1), synthesis of a model (1.2), and stimulating to test the model (1.3). Implementation begins at the same time as model production, rather than after the model is completed, as is often implied or suggested. Implementation involves preparing or getting ready to put the system into operation, actually starting the system operation, and, finally, maintaining on a continuing basis the operation of the system. The third function is evaluation, and this involves, first, defining variables to be evaluated, and then establishing criteria of effectiveness. After it has been determined just what is to be evaluated and what will constitute effectiveness criteria, the next task is to develop or obtain available instruments and techniques appropriate for measurement. Finally, the measurements are taken, results are analyzed, and findings are reported.

Effective implementation of a system depends on having strong relationships between the implementation subsystems and the subsystems in the two other major functions. Ryan (in press) has pointed out the importance of systematization in system design. This refers to the requirement of having strongly established relationships among the parts of a system. The analysis of the real-life environment, which is carried out as a first step in producing a model, and the preparation for implementation are interrelated. Each of these activities depends on and contributes to the other. This is shown in the flowchart model (Figure 1) by the mutually reciprocal signal paths (1.1) $\rightleftharpoons$ (2.1).

In preparing for implementation, data is collected and information is obtained which will be used in synthesizing the model (2.1) $\longrightarrow$ (1.2). Furthermore, preparation for implementation involves getting ready for and providing funds to conduct the evaluation (2.1) $\longrightarrow$ (3.0). The system cannot start (2.0) until the preparation for implementation has been completed (2.1) and the model has been synthesized (1.2), and simulated (1.3) until it has been freed of bugs and malfunctions. The dependence of system operation on prior preparation for implementation and completion of the model is shown in the flowchart model (Figure 1) by the signal paths (2.1) $\longrightarrow$ (1.3) $\longrightarrow$ (2.2).

Simulation of the model involves the use of measurement techniques, perhaps a computer. This is shown by the signal path from (3.2) to (1.3). Thus, evaluation actually begins before the model is finished and continues throughout the life of the system. The variables to be evaluated and the criteria of effectiveness are spelled out in the synthesized model when goals and objectives are defined. This information is fed forward

to the evaluation function (1.2)→(FF)→(3.1).

Maintenance of the system is accomplished by the continuous feedback from formative evaluations, thereby monitoring quality control and directing adjustments in the operating system. A closed loop is created as data from the operating system (2.3) is continuously fed to the measurement subsystem (3.3) where data is analyzed and, results, together with recommendations for modifications and continuance of existing operations, are fed back to the operators (2.3). This closed loop is shown in the model in Figure 1 by the signal paths (2.3)→(3.3)→(F)→(2.3).

From the analysis of the relation of implementation to planning and evaluation, it can be seen that the activities involved in implementing career education depend on both planning and evaluation. For the career education delivery system to be effective, each of the three major functions must be working at optimum level, and the interactions or exchanges between implementation, planning, and evaluation must be taking place. In an analysis of the systems approach, Ryan (in press) has made it clear that a system in which any element is either missing or working at less than optimal level, or in which the necessary interactions are not taking place, will be seriously curtailed in operating effectiveness.

With this frame of reference it is possible now to look in detail at the implementation function. This will be accomplished by identifying the components which make up implementation and describing each one.

Analysis of Career Education Implementation

The implementation of career education involves three major functions: preparation, initiation, and maintenance. Preparation involves getting ready to deliver career education. Initiation of the delivery system is made through pilot testing and field testing. Maintenance refers to full-scale operation. Preparation must take place before initiation, and initiation must precede maintenance. Preparation for implementation is the most complicated, and in a sense the most critical. If adequate and systematic preparations are not carried out, there will be difficulties in initiating the system and subsequent problems in trying to maintain the system. Without adequate preparation, the chances of undue expense and untold problems at a later time are increased manyfold. A model of the implementation function is shown in Figure 2.

PREPARE FOR IMPLEMENTATION (2.1)

Inspection of Figure 2 shows that the first step in implementing career education is preparation (2.1). It also can be seen that there are eleven separate activities carried out in the course of preparing for implementation: conducting public relations, setting policy, organizing committees and staff, arranging community participation, arranging institutional participation, scheduling time, developing program guides, developing staff, developing or obtaining software and hardware, and arranging facilities. These vitally important activities

are closely related to each other, and also influence either directly or indirectly the activities involved in planning, as well as the evaluation of the system. To a large degree the success of implementation is related to the extent to which the various activites involved in the preparation stage are systematically carried out. Some activities should occur simultaneously. In some instances the relationship between activities is reciprocal; in other cases, it is sequential.

CONDUCT PUBLIC RELATIONS/INFORMATION SERVICE (2.1.1). It is doubtful if any career education delivery system can succeed without an adequate program of public relations and information service. A carefully planned promotional program should be organized and carried out to stimulate interest in career education, to make the public aware of the need for and the benefits to be derived from career education, and to develop general understanding of the career education concept. An effective public relations program will present information through formal meetings, commercial television, local radio stations, and local newspapers. A concerted effort must be made to reach members of the local power structure on a person-to-person basis. Programs should be prepared and presented to groups of parents, employers, and community organizations.

Each program should be specifically tailored for the target group to which it will be presented. The presentation of planned programs should incorporate utilization of audio-visual aids. The public relations program must be planned as a single function, implemented through a variety of strategies. This will insure that the same message is being conveyed through the various avenues, and avoid confusion which comes from having one message being given in one place and a different message being presented in another. It only creates confusion, for example, if parents are given one concept of career education in a community program, and at the same time the local television station is presenting a different concept. It is essential for the planners of a career education system to be involved in the public relations program. Unless those who are responsible for producing the model actually take part in planning the public relations and information service program, there is no way to achieve effective public relations or to obtain the support career education must have to succeed.

In the model (Figure 2) the signal path from ESTABLISH CONCEPTUAL FRAMEWORK to CONDUCT PUBLIC RELATIONS/INFORMATION SERVICE (1.1.1)⟶(2.1.1) established the relationship between the planners and the public relations program. The model also points to the continuing nature of public relations. It can be seen that one of the functions of the advisory committee is public relations (2.1.4.1)⟶(2.1.1). Since the committee is actively involved in the total system implementation, this means public relations will be going on all the time. It also can be seen that public relations involves community participation, and at the same time the extent to which members of the community become involved in career education depends to some extent on the effectiveness of the information service and the public relations program. This mutually reciprocal relationship is shown in the model by the signal paths (2.1.1)⟷(2.1.5).

An important purpose of the public relations program is to establish the kind of support base that is needed for getting enabling legislation and local policies enacted. In a systematically implemented career education program, the public relations function is carried out as a means to getting legislation enacted and policies set. In any situation, information will be communicated. When this communication is unplanned there is apt to be a lot of misinformation reaching those in the power structure, and the results can seriously impede implementation of career education in that particular setting. The signal path (2.1.1)→(2.1.2) establishes the sequence for conducting public relations as a prerequisite to establishing policy.

ESTABLISH ENABLING LEGISLATION/SET POLICY (2.1.2). Hoyt et al. (1974), in making a strong case for having legislation passed to support career education, identified nine aspects of the delivery system requiring some kind of legislation backing:

1. elementary, middle, secondary, post-secondary, and continuing education programs
2. business and industry programs
3. work-study programs
4. vocational guidance
5. placement
6. curriculum development and materials development
7. professional personnel development
8. parent education and homemaking
9. research and development

It is not sufficient to get legislation passed to support career education. It is equally important to have career education established as a high priority in the particular local setting. It is important for those involved in planning the system and producing a model for the system to take part in planning the strategy for getting needed legislation and policies established. The goals, subgoals, and objectives which are defined in the model must be compatible with the mission and must derive from the philosophy of the particular institution or agency.

This compatibility of institutional or agency mission and the career education delivery system goals is accomplished largely through having the planners, who know the conceptual framework for the model, involved in getting needed legislation and policy enacted. Hoyt et al. (1974) emphasize the fact that educational objectives derive from policy, which, in turn, is determined by boards, legislatures, or other governing bodies. It is important to have some kind of policy statement which establishes career education as an important part of the mission for the particular setting. Hoyt et al. (1974) give an example of the kind of

policy statement which is needed:

> The People of the State of California do enact as follows:
>
> The Legislature hereby recognizes that it is the policy of the State of California to provide educational opportunity to every individual to the end that every student leaving school should be prepared to enter the world of work; that every student who graduates from any state-supported educaational institution should have sufficient marketable skills for legitimate remunerative employment; and that every qualified and eligible adult citizen should be afforded an educational opportunity to become suitably employable in some remunerative field of employment. (p. 196)

Hoyt et al. (1974) also have presented a simply stated resolution of a local school district which exemplifies the kind of policy statement which is needed at the level of the institutional or local agency:

> We believe that it should be the policy of our school district to provide career education for all youths and adults of the district, to the end that no student drops out of school who is not prepared to enter the world of work, that no student graduates who does not have salable skills for productive work or college education, and that no adult is denied an educational opportunity to become properly employed. (p. 196)

The statements which are presented in the state law and the local school district resolution establish career education as a priority. They reflect a commitment to career education and give a sense of general direction. However, they do not establish the end product. These are policy statements, not system goals or objectives. The goals and objectives, however, will be determined in part by what is set forth in the policy statements.

Another kind of enabling legislation is found in appropriation acts, in which funds are earmarked specifically to support the various components of career education. This is shown in the model (Figure 2) by the signal path (2.1.2)⟶(2.1.3).

ALLOCATE/PROVIDE FUNDS (2.1.3). There is probably no function in the preparation for implementation more critical than this one relating to the allocation and provision of financial support for the career education delivery system. In carrying out this function, costs are determined and all essential funding arrangements are made. Funding may come from a variety of sources. It is important for all funds to be determined in advance, and for requests or applications to be sent to appropriate funding sources well before the deadline dates. In the planning for funding, cost items should be assigned by category, thereby facilitating cost-benefit analyses. Funds will be required for conducting public relations, supporting committee activities, development of the career education program guide, staff development, hardware and software,

and facilities. These elements are all part of the preparation for implementation. Funds also are needed to support the pilot and field testing which are done in initiating the system, as well as for actually operating the system. Funds must be budgeted to support both planning and evaluation functions.

Some kind of program guide or curriculum guide is needed for the delivery of career education. The development of such a guide is part of preparation for implementing the system, and this will require an adequate budget to support development activities. Special orientation and training programs for those who will use the guides must be figured into the budget. In figuring the budget for training, it is important to allocate funds for stipends, travel, salaries, honoraria, materials, services, and facilities. Funds to either purchase or develop hardware and software to be used in implementing the system must be provided. All software, including staff training materials, evaluation forms, and curriculum materials, and all hardware, should be itemized and incorporated in the budget. Costs for textbooks, workbooks, pamphlets, manuals, and other essential publications should be calculated and included in the budget. It is important to calculate costs of implementation according to preparation, initiation, and maintenance categories. This will facilitate cost-benefit analyses.

When all costs have been determined, accounting procedures must be established. Two effective techniques which implement a system approach are Program Evaluation Review Technique (PERT), and Program Planning and Budgeting System (PPBS). A PERT cost diagram will provide an efficient way to account for costs in implementation. The PERT cost system should be used:

> to aid in development of a more realistic project estimate; to compare estimated and actual costs at any selected point in the program; to help determine the best allocation of resources to project activities; and to forecast total project costs based upon program cost position throughout the project. (Cook, 1966, p. 32)

The critical nature of the funding function in implementation of career education is pointed out in the flowchart model (Figure 2) which shows eight signal paths going out from the ALLOCATE/PROVIDE FUNDS function (2.1.3).

ESTABLISH ADVISORY COMMITTEE/ORGANIZE STAFF (2.1.4). A set of working committees and a program staff must be organized before career education can be delivered. The organization of the advisory committee should follow the first stage of the public information program. It is foolhardy to appoint people to an advisory committee unless they first know what the program is all about. This sequential relationship is shown in the flowchart model (Figure 2) by the signal path (2.1.1)⟶(2.1.4).

After information about career education has reached the public in a particular area, then an organizational meeting can be called and

invitations issued to delegates representing business, industry, labor, education, social services, corrections, civic groups, volunteer groups, special interest/minority groups, and the target learner groups. It is important that the agenda of this organizational meeting be the responsibility of those who are responsible for developing the career education delivery system model. The program should be devoted primarily to the presentation of the procedures and results of the analysis of the existing situation and the tentative structure of the conceptual framework. Statements of policy and documents of enabling legislation should be presented and explained. Hoyt et al. (1974) recommend the use of audio-visual aids as much as possible in the presentation given during this meeting. After an information input period, followed by a discussion period, the participants should be assigned to four groups: steering, institutional planning, community planning, and research. A chairman and recorder should be designated for each group, and a task assignment sheet should be given to each chairman. The task assignment sheet should state the purpose of the group, provide a list of tentative activities, and give a timeline of activities and events. The task for each group will be to organize, define objectives implementing the stated purpose, and plan methods for achieving the objectives.

The major purpose of the four groups will be as follows:

1. Steering Committee. To provide support for the executive function through public relations, liaison with policy-making groups, advice about program development, and evaluation.

2. Institutional Planning Committee. To arrange institutional participation, contribute to synthesis of the model, and inventory institutional resources.

3. Community Planning Committee. To arrange community participation, contribute to synthesis of the model, and inventory community resources.

4. Research Committee. To contribute to development of the program guide, the delivery system model, and the staff development activities.

The steering committee functions as an executive body, providing general direction, coordinating activities, and reporting to official bodies and agencies inside and outside the setting. The steering committee provides advice to the program director who has the responsibility and is accountable for implementing the delivery system.

The institutional committee works with institutional staff to introduce change into the existing program. This group must determine how career education can fit into the ongoing system. The members of this committee must take part in analysis of the existing programs and resources, and also should make suggestions for determining alternatives to achieve objectives of career education.

The community committee has an important part to play in the implementation of a career education system, since career education involves

the liaison of institution and community. This committee must identify career education resources in the community that are outside the institution, and provide for assessing these resources so they can be available as learning experiences. This committee must conduct the community census which is part of the analysis of the existing situation carried out in planning the system. This committee must classify and assess all volunteers and all learning resources in the community, and must also develop plans for utilizing the learning experiences which are outside the institution to achieve career education objectives.

The research committee is responsible for collecting information and reports on observations and assessments of the career education implementations in other settings, as well as the reported results of exemplary and experimental programs, and research and development projects.

The advisory committee is an important part of implementing career development. It is through this element that leadership and energy are provided to see that all the parts of the system are present and functioning at optimum level.

ARRANGE COMMUNITY PARTICIPATION (2.1.5). The delivery of career education in any setting requires active participation of the community. An essential prerequisite to the implementation of career education is the preparation of the community for its part in the system operation. This is achieved as subsystem (2.1.5) is carried out, and arrangements are made for various elements in the community to participate in the career education program.

The community planning committee which was organized in (2.1.4.3) plays an active part in arranging community participation. One of the important functions of the committee is making an inventory of community resources, and marshalling these resources for the career education delivery system. It is important to identify available resources, and to describe ways in which a facility, person, hardware, or software might contribute to a career education experience. The success of career education depends in large measure on the extent to which community resources are used to achieve career education goals. Sessions (1972) has made the point that it is not enough for organized labor to be <u>involved</u> in career education; rather, units of organized labor must actively <u>participate</u> in the program. This means that experiences and activities will be provided by community agencies, and much of the career education program will take place in the community.

For career education to be successful, it is essential that the delivery system be implemented in the context of cooperation and participation. The potential of career education can never be realized if local school systems, state agencies, or institutions attempt to work in isolation from each other or from other agencies in the community.

ARRANGE INSTITUTIONAL PARTICIPATION (2.1.6). The delivery of career education experiences to any group of learners will involve participation

of the institution or agency in which the learners are enrolled, as well as the larger community. The institution could be a school, in which case the administration, instruction, and support services must take part in providing career education experiences to the learners. If the institution were a correctional facility, the administration, security, treatment, and prison industry would have to take an active part in providing awareness, exploration, and preparation experiences as well as engaging in placement and follow-up activities. The essential aspect in arranging institutional participation is getting a commitment from each department or functional unit to take part in providing career education to the individuals enrolled in the institution. One of the first things to do in getting institutional participation is to inventory the resources available in the institution or agency.

In arranging for institutional participation it is essential to bear in mind that implementation of career education does not require additional components within the existing educational system, but rather a conceptual change throughout the system (Hoyt et al., 1974). The need is not so much for new personnel as for reorientation of the existing professional staff.

SCHEDULE TIME (2.1.7). Scheduling time is the translation of a plan into a timetable with calendar dates specified for starting and completing the various segments of the delivery system. In preparing for implementation a timetable must be worked out for getting the program guide developed, obtaining or developing hardware and software, training staff, and arranging for facilities. The timetable also must specify the target dates for pilot testing, field testing, and, finally, full scale operation. Each activity must be scheduled according to the time which will be required to complete it. Time which is allotted to an activity can be expanded or reduced, depending on the actual situation, as long as the outside time parameters are satisfied.

After a time schedule has been prepared, a chart should be made to show the interrelationships among the various components and to give a picture of the total operation against a timeline. Critical points should be identified to insure that prerequisite activities are accomplished in time. Sufficient time should be allotted for each activity. A PERT/Time diagram can be used to establish a logical work breakdown structure against a time framework. A PERT diagram will identify events and activities. Events are outcomes which do not consume time or resources and which occur at specific points in time. Activities consist of work which must be performed before an event can occur. Activities consume time and resources.

DEVELOP PROGRAM GUIDE (2.1.8). In developing any new product a guide to its use should be produced so that those who use the product will be able to get the most from its use. Unless a product is used as the producers intended, it is not likely that the full potential will be derived from the product. Career education can be likened to a new product, and those who are to be involved in implementing the delivery system

of career education need a guide to direct their activities. The model (1.2.4) is used to identify concepts to be expanded into modules of learning activities.

The career education program or curriculum guide, which presents the learning modules in an organized manner, should cover the theory or rationale behind career education, the conceptual frame of reference within which the delivery system model was developed. The guide should explain all the specific procedures involved in delivery of career education. It should indicate instruments of evaluation to be used and should emphasize the importance of feedback.

A career education guide should present the goals and subgaols to be implemented, and should give examples of learner objectives, together with descriptions of learning activities which could be used to achieve the different objectives. The learner objectives and learning experiences provided in the guide should be tried out on a sample of individuals like those who will constitute the learner group when the system is in operation. The guide should also contain supplementary information, such as directories of sources of career education hardware and software, references, and descriptions of commercially-prepared career education materials.

RECRUIT/SELECT/DEVELOP STAFF (2.1.9). In implementing career education, staff recruitment and selection probably are not as critical as staff development. Since career education is not an additional program, but rather a reconceptualization of an existing program, it is unlikely that there will be need for recruiting new staff other than someone responsible for coordinating the total system. The signal path (2.1.9)→(2.1.4.1) shows that program staff working with the steering committee should be selected carefully. It is important that anyone with responsibility for coordinating the total system be thoroughly familiar with career education concepts and enthusiastic about the potential benefits to be derived from implementation of the system.

Staff training is a critical function, and the success of implementing career education depends in large measure on the way in which this function is carried out. Staff involved in pilot and field testing, as well as those who will be actually responsible for installation and maintenance of the system, will be working with materials and equipment, using methods and techniques of presentation, and employing modes of thought and concepts which are new.

To insure the effective utilization of the materials, training and orientation procedures must be initiated. The orientation should reassure the staff person of his or her role in the delivery system, and give a broad overview of the career education system. Training should be provided at two levels: basic and advanced. In the basic training participants should develop their capabilities for using new materials and techniques, should expand their vision of the environment in which career education takes place, and develop a thorough understanding of

the conceptual framework for career education and the nature of the career education delivery system. Career education relies heavily on individualization of instruction. Most staff members will need training in diagnosing needs of individuals and prescribing appropriate learning experiences to contribute to the career development of the individual. Staff members need to know the relationships of career education to other programs, and must acquire skills for infusing career education experiences into all aspects of the educational system.

Advanced training should be primarily training for leadership roles. Ideally advanced training should follow closely after basic training. This makes it possible to build on the new knowledge and skills which were developed in the basic program. If too much time elapses after the basic training has been completed, time will have to be devoted to review and relearning. Selection of participatnts for advanced training is extremely important. Those selected should be from among those who completed the basic program successfully, and selection should be made in terms of demonstrated potential for implementing leadership roles. In the advanced program it is important to have a cross-section of participants coming from a variety of settings. Hoyt et al. (1974) have stressed the importance of providing for cross-fertilization of ideas and the interchange of successful methods and experiences.

The basic program can use the seminar, workshop, or institute format. The advanced program should include an internship experience, in addition to the seminar or workshop. From the pool of individuals having participated in the training program, teams of trainers can be constituted to provide continuing in-service training to staff members of any given institution or agency. The basic training can be given on a regional basis, and the advanced training should be arranged for a central location within a state with representatives from each of the regions participating. This will result in training teams comprised of a team leader, who has participated in both basic and advanced training, and two or three team members from the basic program. These training teams can design training systems for local settings and deliver this kind of career education training through a variety of formats, including the mini-workshop or seminar, weekend retreats, or regular staff meetings.

Staff development for a career education delivery system also requires orientation for personnel outside the institution or agency. Hoyt et al. (1974) have pointed out that administrators, counselors, teachers, coordinators, and community workers are key persons in the implementation of career education. Some orientation must be provided to administrators, support personnel, community leaders, and parents. University teacher trainers must be oriented to career education. Preparation programs for teachers, counselors, and administrators must integrate career education concepts and methods into their respective pre- and in-service curricula (Gysbers et al., 1974).

The nature of career education is such that no individual in any institution or agency can be considered outside the system, and many outside the institution or agency must be considered inside the system. Parents

and family members must be informed of the intent of the system. Members of governing boards, legislators, and those in the power structure must be informed. In the flowchart model (Figure 2) this relationship between staff development and the information service is shown by the signal path (2.1.9)⟶(2.1.1). Orientation of parents, family members and community groups can be made through letter, meetings, and television. The training function also must reach those who are involved in planning the system and developing the delivery system model, as well as those with evaluation responsibilities. The flowchart model (Figure 2) shows these relationships in the signal paths going from (2.1.9) to (1.1.1) and (3.0).

The time schedule for staff development must be worked out early in the process of preparing for implementation. The schedule must provide an integrated sequencing of basic and advanced training which must precede the time set for initiation of the system. Staff training also must be part of efforts to develop hardware and software and in the development of the program guide. The time schedule for training should be such that eventually each person involved in the delivery of career education will have the knowledge and skills for implementing his or her role in the delivery system.

DEVELOP/OBTAIN SOFTWARE/HARDWARE (2.1.10). A vitally important part of making preparations for implementation is the development of materials to be used in providing experiences of awareness, exploration, and preparation. It ordinarily is not necessary to develop hardware, as this most likely can be obtained commercially. It also is possible that much of the commercially-available software can be used. However, there probably will be a need to develop some materials designed especially for the target learner group. The model (1.2.4) is used in developing materials and selecting hardware. The program guide (2.1.8) also is used, since the guide contains a description of various learning activities involving use of hardware/software combinations. The materials which are developed are contained in the listing of career education materials presented in the guide.

All materials must go through the developmental stages of exploration or simulation, pilot testing, and field testing, with revisions based on feedback from the testing runs. Since the career education concept was introduced in the U.S. Office of Education, a multitude of new educational products has been produced. Some of these materials have been subjected to rigorous validation procedures, and others have had only limited testing. Extensive testing and evaluation are not essential to the development of all career education products. In some instances, one demonstration of the product's capability for attaining particular career education objectives may be sufficient. It often is possible to perform a cost-benefit analysis of product use with a relatively small, isolated group, just as reliably as with a large group spread over a wide geographic area.

ARRANGE FACILITIES/SITES (2.1.11). Arrangements must be made for test sites and facilities, as well as for the eventual installation of

the career education system in the various institutions in a given situation.

A number of variables need to be considered in selecting sites for testing components as well as the total system. Geographic considerations should be made in selecting test sites. If the career education system is being designed for a localized target population, then the system components will be tested over a considerably smaller geographic area than when the system is designed for widespread, general use. In cases where the system involves use of large, expensive pieces of hardware, the cost of transportation, installation, and maintenance can make it unfeasible to have widely dispersed test sites. It is important to consider the availability of technical assistance, both human and mechanical resources, during testing and subsequently when the system is in full-scale operation.

The time sequence for installing the career education delivery system in a number of settings must be considered carefully. It is important in working out the time schedule to prepare a plan which will provide for building on success. The sites selected for the early installation should be those with a history of openness to new ideas, where initial staff development will precede the actual operation of the career education program, and where staff morale is high.

INITIATE SYSTEM (2.2)

Many of the preparations for implementation must take place before the system can be initiated. Some of the activities involved in preparing for implementation involve the testing functions which are carried out in the initiation stage. Initiation of the career education delivery system is concerned primarily with pilot testing and field testing.

CONDUCT PILOT TEST (2.2.1). There are two parts to pilot testing the career education delivery system. The first step in the developmental testing of the various segments of the system. In pilot testing, preliminary validation of the various segments of the prototype is made, and attention is directed to determining the most efficient presentation of sequences for achieving the objectives and the best combinations of the elements in the system.

In the first part of pilot testing, each component is checked and revised according to feedback from the test. This is shown in the flowchart model (Figure 2) by the feedback signal path from (2.2.1) to (2.1). Before trying out the career education system as a whole, tests will be carried out to see if changes are needed in the public relations and information service (2.1.1); if new policy or legislation is required (2.1.2); if changes in the budget are needed (2.1.3); if the working committees or program staff should be changed (2.1.4); if changes in arrangements for community participation (2.1.5) and institutional participation (2.1.6) are needed; if changes are needed in the program guide (2.1.8); if adjustments are needed in the time schedule (2.1.7); if modifications are

needed in the staff development program (2.1.9); if new materials are needed or changes are needed in the materials which were produced to implement the guide (2.1.10); and if adjustments are needed in the plan for installing the system in various locations (2.1.11).

It is important in carrying out the pilot test, which will involve only a limited sample of learners to select the sample with care. If the career education system is to include the disadvantaged in the learner population, the pilot test still can be done primarily at sites with largely middle class learners, and only a small pilot run on a few disadvantaged learners. If the system is to be used with a broad, general population, the sites for the pilot test should be analyzed in terms of such variables as ethnic composition, maturity of learners, and socioeconomic status of learners. Any site selected for pilot testing should be fairly typical of the sites where the career education system ultimately will be installed.

CONDUCT FIELD TEST (2.2.2). The next step in initiating the system is field testing. The objectives are to determine the usefulness and viability of the career education delivery system in a natural environment like that in which the system will be maintained. In field testing, consideration is given to measuring effectiveness, costs, endurance, and potential in a real-life situation. The successful functioning of a completely assembled delivery system in a natural environment is substantial empirical proof of a viable and useful system. The field testing of a delivery system of career education will provide a basis for comparing the system in one particular setting with career education systems in other settings.

In pilot testing (2.2.1) segments of the newly developed prototypical system are tested and evaluated individually to determine their particular viabilities and also to establish the potential value of the system as a whole. The segments are integrated into a working approximation of the complete system, and then tested to establish whether or not the subsystems which worked well separately also can function efficiently when synthesized into a whole.

Field testing, on the other hand, is designed to tryout and to evaluate the entire system under conditions as near as possible to the operational conditions which will prevail when the system is installed and maintained. This testing is done on a relatively large scale in a natural environment. The field testing of a career education delivery system should make clear the correlation of particular learning experiences with identifiable behavioral changes. In the field tests differential effects of the career education program should be revealed, since these tests will take into account the range of individual differences in the learner group as well as the staff. It is possible that some parts of the program can be effective with some learner groups, but not with others.

If the full capabilities of a career education program are to be ascertained, the field test should be made in a number of highly responsive, enthusiastic, innovative settings. An effort also should be made to

include some of the less innovative settings in the array of test sites, to see how well the system can function under less than optimal conditions. There is a relationship between evaluation and both pilot and field testing. This is shown in the model (Figure 2) by the signal path (3.0)⟶(2.2).

Field testing is the final essential step in the development and validation process prior to putting the system into full-scale operation.

MAINTAIN SYSTEM (2.3)

Once the career education program has been field tested and any suggested revisions have been made, then it can be installed and operated on a continuing basis. To maintain the system, there must be a closed loop from system operation to evaluation to provide continuous feedback and direct adjustments in the operating system. This is shown in the model (Figure 2) by the signal paths (2.3.1)⟶(3.3)
(3.3)⟶(F)⟶(2.3.1).

INSTALL SYSTEM (2.3.1). Installing the career education program in any given setting takes place according to the predetermined time schedule (2.1.7). It is important that preliminary groundwork be carried out so the environment is receptive. A sure way to force the failure of a career education system is to mandate installation from the top down. A carefully planned and instituted system of information dissemination and public relations (1.3.1) is a prerequisite to career education installation (3.1.1) in any setting.

The staff must be prepared for their respective roles in delivery of career education experiences before installing the program in any particular location. It will do little if any good to mail career education curriculum guides on a wholesale basis with an administative order to install the curriculum. Installation of career education requires an enthusiastic staff whose members believe in career education and appreciate the implications and benefits both for themselves and for the learners in their particular setting.

OPERATE SYSTEM (2.3.2). Once the career education system is installed in a particular setting, then the operations must be carried out on a continuing basis with experiences of awareness, exploration, and preparation being provided, and placement and follow-up activities taking place. The system operation represents the interfacing of learners, staff, and program. Operation of the program and evaluation occur simultaneously, and evaluative feedback is channeled back to direct changes in the operating system. In a considered analysis of evaluation, Stufflebeam (1968) stated,

> The objective of process evaluation is to detect or predict, during the implementation stages, defects in the procedural design or its implementation. The overall strategy is to

identify and monitor, on a continuing basis, the potential sources of failure in a project. These include interpersonal relationships among staff and students; communication channels; logistics; understanding of and agreement with the intent of the program by persons involved in and affected by it; adequacy of the resources, physical facilities, staff, and time schedule. (p. 10)

Conclusions

This model of career education implementation defines three major functions which constitute the essential elements in the implementation process. The model emphasizes the interrelatedness of implementation to both planning and evaluation of career education. The model, assuming a foundation of local initiative fostered and reinforced at regional and national levels, provides a viable means of realizing the personal and social potential of career education in any setting.

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Systems Designs and the Evaluation of Educational Programs

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A general curriculum design, as a series of expected learnings, is a conceptual system. Based upon expected learnings it is designed to influence student behavior and shape their futures and the future of society. The evaluation of educational programs has until recently been far more modest in its intentions and less global in its sweep. This has been the result of number of limitations in evaluation theory and methology springing from the origins of the field in educational psychological measurement and laboratory research. These constraints have also limited the usefulness of evaluation to practitioners. Systems design offers some suggestions for these perennial problems of the evaluator of large curriculum projects. The purpose of this paper is to present a description of the evaluation of two curricula, one at a building level in an experimental middle school, and one in a school system, K-8, which includes nine schools. The focus of this paper will be on the evaluation of the changes in the curricula and how systems design can be useful in choosing methodological approaches and in analyzing and interpreting data. In both studies curriculum changes were sought and though each employed different approaches they were attacking problems common to all school systems concerned with implementing change.

Curriculum Change

Curriculum change is a shopworn topic with much of what passes for informed opinion being at the level of "professional folklore." It has long been observed that curriculum systems prevailing in a school are strongly resistive to imposition of change and repeatedly manifest the tendency to revert back to a previous prevailing steady state of practice. Parenthetically, it must be observed that the Ford Foundation has been one of the latest to invest millions of dollars in making this learned, but obvious to those experienced with schools, discovery (Ford Foundation, 1972). On these phenomena, the concepts of systems theory concerning the mapping of the components of a system, the identification of systems interrelatedness, and identification of the system significant to plotting a strategy for change, have been helpful in guiding evaluation efforts and upgrading the theoretical analysis. For purposes of establishing a setting for the two case studies, three commonly used approaches to curriculum change are summarized.

Approaches to Curriculum Change

Curricula in schools have the quality of systems inasmuch as once they are established and have accumulated a history of practice they

...aining the integrity of their vital components. To be ...mphasis in subject matter, its organi... ...of teachers and students in instruc... ...rand, 1969) and the judgments on which ... based tend to remain constant. To break the cake of custom has been the chief preoccupation of educational innovators and they have atheoretically launched their efforts at various parts and whole combinations of the curriculum system.

Instructional Systems. One approach has been to design complete instructional systems that would displace the entire curriculum system of a school, with the exception of the teaching staff, although personnel roles are redefined and in some cases augmented by paraprofessionals. Three of these instructional systems commercially available are: Individually Prescribed Instruction (IPI), Individually Guided Education (IGE), and Program for Learning in Accordance with Needs (PLAN*). Heavily committed to assumptions on individualization of instruction, they have evolved through extensive developmental work systems of instruction which can be wholesaled into a school curriculum through displacement of the original curriculum system and in some cases substitution of other materials. In implementation they require retraining of staff and close attention to evaluation of results if they are to live up to expectations.

Despite the heavy investment in developmental costs, as much as 15 million dollars, and careful consideration of the problems of implementation, a recent study completed by the author's office (EPIE, 1974) found that once underway these instructional systems may still creak and groan from teacher-administrator misuse. Moreover, in tightly structuring materials they become very unforgiving if staff deviates from the diagnosis, evaluation, or prescription. One particular finding which has special significance for this topic of concern is the effect they had on students' assessment of the quality of classroom life. Their influence was not uniform on all students, as one might guess, but once entrenched they assume characteristics of self-contained ecosystems in directing student behaviors toward subject matter and student interactions. As approaches to changing curriculum systems, they are attractive for schools as systems that synthesize materials, technology, and step by step implementation. Their very complexity, however, imposes problems of staff training, system adaptation, and cost, which some schools find prohibitive.

Subject Reorganization. A second approach to curriculum change, and one that received heavy federal support in curriculum projects over the '60's approached the curriculum system as separate parts organized around subject disciplines. The history of this is so close and the scope of the effort of such a magnitude that scarcely anyone with even the slightest involvement in education was untouched by results.

With a high priority on materials re-organization and development, these separate subject approaches again built packages that presumably would replace the traditional curriculum by displacement. A not unusual route was to put new curriculum subject matter and teaching procedures

into a convenient instructional package of textbook, instructor's guide, and adjunct teaching materials. Oriented largely to the academically-talented and designed by college professors whose major interests resided within this cohort of the student population, these instructional packages had a mixed reception in the schools. Not a few reduced student enthusiasm for the discipline and consequently enrollment in subjects. Ample evidence on one found that students came out with better theoretical knowledge of the subjects, along the line acquired by hundreds of now unemployed Ph.D.s but with inadequate general knowledge of the skills commonly used by laymen.

Again, their chief attraction for schools seemed to lay in the ready-made product which did not have to be produced in situ but could be inserted through a displacement of the traditional curriculum. That the ready-made product also carried a price in negative results for some students is only now being assessed. Further, a shift in curriculum objectives from mastery of formal, organization conceptual systems to greater stress on self-development expressed in a social unrest among students fueled the critical reaction to this approach to curriculum change.

The School or School Systems as Change Units. A third approach to curriculum change which was used when school systems were living in leaner times (Caswell, 1950), but is now being revived because it was more sensitive to the system characteristics of curriculum, is a more boot-strap operation which is adopted to the specific building unit or school system. In this approach the local school system or building recognizes a problem, organizes for a solution, and proceeds to change the curriculum system by a variety of changes; for example: staffing, staff retraining, the materials used, the redefinition of roles of students and teachers, and the restructuring of graded experiences. What was born of economic adversity has been resuscitated by the infusion of federal educational funds searching for innovation, and federal court orders seeking equality of educational opportunity.

With the advent of fiscal support, several new wrinkles have been added to the formerly boot-strap operation; primarily planning time, consultants, better staffing, more materials and evaluation. On the latter component, particularly where state and federal funds were involved, outside evaluation became a requirement. In some circles this approach to changing curriculum was believed to hold more promise of effecting permanent change in a system that had been stubbornly resilient (Watson, 1967).

Evaluation of Curriculum Systems

The two case studies on evaluation of curriculum systems fit under the third approach to curriculum change. They differ sharply in their approach to curriculum change and offer special problems in the evaluation of the effects of change on students.

Case One--Clocksville, Model School

Clocksville is composed of an old core city which has in the last decade become a burgeoning suburb. Its schools are expanding rapidly and contain the range of diverse student populations that one would find in a large metropolitan area. The system, whose seven junior high schools range in size from 300 to 1,200 within their populations reflect differences on socio-economic variables, but as units are fairly heterogeneous in race and ethnic composition. Curriculum in each of these schools is the traditional offering of core subjects with a smattering of electives. Within the community and among a minority of the school staff there has been a dissatisfaction with the junior high school program, specifically its lack of appeal to many intelligent students. An application was made to the state for funds to develop an innovative program, and a three-year funding designating a planning year and two operating years was received.

Outside evaluators were engaged first for the planning year to design the evaluation and then for the last two years to conduct the evaluation. Since the curriculum system was seen as an emergent as opposed to an established situation (Boguslaw, 1965), it was agreed that the evaluators would meet with the community and the Model School staff twice each operating year to give them feedback to aid their planning. Six general objectives were stated for guiding the development of a curriculum system:

1. The Model School is to secure greater community involvement in all phases of the program and operation, and obtain greater parental understanding and satisfaction.

2. The Model School is to produce greater gains in the students' cognitive growth.

3. The Model School is to obtain greater affective growth in its students.

4. The Model School is to provide a more open, democratic classroom environment.

5. The Model School is to improve the coordination of the pupil-personnel efforts and instructions.

6. The Model School Program is to be provided at a favorable cost-benefit ratio to the other junior high school programs.

As in most curriculum projects, considerable time was spent specifying the variables which were to be used for measurement of effects, and, subsequently, the selection and design of instruments. The objectives, the instruments used in their measurement, data gathering sources, and the treatment of data are shown in Table 1.

A student body was solicited for the school through notices sent home to all fifth, sixth, and seventh grade students. These notices described the curriculum, which was to be set up in a separate building, as a non-traditional "humanistic-oriented" program with major inputs by

students and community. Funding and space dictated a school of 300 students; over 600 applications poured in by the end of the planning year.

Consulted on a solution to a sticky public relations problem, the evaluators developed a plan for randomly selecting the student body for Model School and using the remaining pool of students as a control group. This design feature added rigor to the evaluation and vastly increased the confidence that one could place in the results being a consequence of the curriculum system (Campbell & Stanley, 1963). The significance of randomization of students to treatment and its implications for interpretation of results are seen when the eighth grade achievement tests of the Model School (experiemental group) are compared with the district means, a not uncommon evaluation procedure, and then compared with the control group (See Figure 1). If the experimental group had been compared only with district averages, as is done frequently when a contrast group is used, the interpretations of results of the curriculum treatment would be distorted by the original differences in the two groups. When differences were found as they were on several of the objectives, these were seen as more likely the product of the treatment than being an artifact of the subjects.

Table 1
Evaluation Research Design Matrix for Clocksville

Objectives	Instruments and Data Collection	Populations	Data Treatment
1. Community Involvement	Parent Participation Logs	X parents	Content Analysis
	Telephone Interviews	X & C parents	Content Analysis, Comparisons to Published Norms
	Records of Committee Meetings	X parents	Content Analysis
2. Students' Cognitive Growth	SRA Achievement Tests	X & C students	Comparisons Between Groups (t-tests and ANOVA)
	Questionnaires and Interviews	Sample of X & C students and teachers	Content Analysis
3. Students' Affective Growth	LEI[1] and "How I See Myself"[2] scales	X & C students	Comparisons Between Groups (t-tests)
	Questionnairs and Interviews	Sample of X & C students and teachers	Content Analysis
	Records of Committee Meetings	X students	Content Analysis
4. Democratic Classroom Environment	Kunkel-McElhinney Observation Form[3]	Sample of X & C classrooms	Comparisons Between Groups (t-tests, mean profiles)
	Questionnaires and Interviews	Sample of X & C students and teachers	Content Analysis
5. Pupil Personnel Services	Questionnaires and Interviews	Sample of X & C students and teachers	Content Analysis
6. Cost-Benefit of Program	Budget for X School & Y Jr. High School		Comparison of Costs

Note. Footnotes appear on page 94.

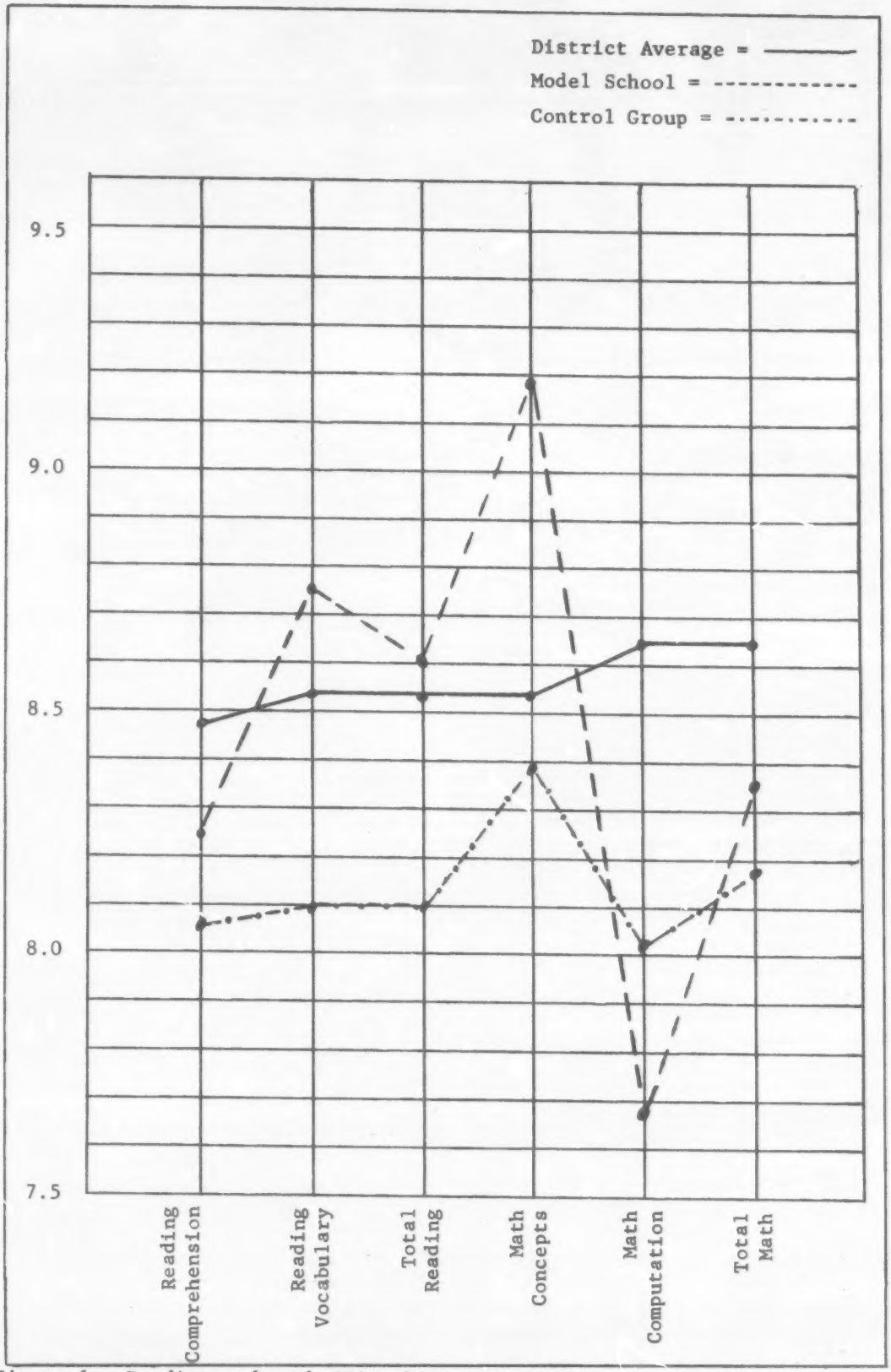

Figure 1. Reading and math SRA achievement grade equivalencies for grade 8: Model school, control group, and district average.

After a bumpy start, the Model School completed two years of operation with the following, final results on its six objectives:

Objective 1. Greater community participation and satisfaction. The Model School achieved greater participation by parents in all phases of the school program. On a separate measure of general attitudes toward education the Model School, parents, while evidencing greater satisfaction with the Model School program, did not differ from a sample of parents of the control students.

Objective 2. Producing greater cognitive growth. As measured on a standardized achievement test, the Model School students did not make significantly greater gains in achievement. Other measures revealed that there were more independent learning projects by the Model School students and that they were more resourceful in using school personnel in helping them with academic and personal problems.

Objective 3. Obtaining more affective growth. This was the area in which Model School students made their greatest gain. Their perception of the learning environment over the two years found statistically significant gains in comparative measures of greater group cohesiveness; viewing classes as more individualized; learning more pleasurable and less pressured; less friction with their peers; seeing less teacher favorites; less cliqueness among peers; less apathy toward classes; and lowered competitiveness with peers. When further comparisons were made between the experimental students at Model School and their control counterparts in the seven other junior high schools, startling differences were found, which lend credence to the belief that building units do become ecosystems with distinctive climates. While all control schools showed some differences with the Model School, two of the extreme schools had significant negative differences on 12 and 10 of the 15 scales used to measure the learning environment. Confirming evidence found these schools to be low on individualization of instruction and high on competition.

A self-concept measure produced no significant differences in the two groups in the first year but on the second year found differences on a scale which relates feelings of self to teacher-school and feelings of autonomy. On these two measures Model School students were significantly higher with more positive feelings toward teachers and the school and greater feelings of autonomy in directing their lives and education.

Objective 4. A more open democratic classroom environment. Classroom observations over the two years verified that the Model School curriculum had a more democratic classroom environment when defined as a place where students' interests were rewarded, students' choices were respected, and students' values and feelings were involved in classroom activities. In this area, first efforts to relax controls and open up choices produced norms set by high risk behavior students who were antagonistic to authority and who flaunted community standards. Model School staff discovered rather quickly that Rousseau reads better than he plays. In keeping with other innovations, they found that some structure was needed to get a curriculum system operating, and students,

teachers, and parents were happier when a more task-oriented environment was restored after an excursion into license.

Objective 5. Improved coordination of the pupil personnel services and instruction. Comparative data gained from interviews and questionnaires from the two groups on the personnel services found that in the Model School, counseling and guidance of students occurred on a less formal, less scheduled basis. In addition, the concerns of adolescence was more prominent in the classroom instruction. Model School students were far more likely to approach teachers with problems and to see them as a resource.

Objective 6. Cost-benefit analysis. A comparison was made of the cost of Model School during the first year with a new junior high school opening in the same year. It was found that by using out-of-school resources, the Model School had less start up costs and a lower per pupil expenditure than the newly opened junior high school.

After the second operating year, the Model School was closed much to the parents' distress. Prior to closing, a delegation exacted a promise from the school board to start counterparts of the Model School with its more open curriculum as units of the other junior high schools. Some were started in the fall of 1974, but their performance and continuance is problematical. A factor in Model School's success was undoubtedly based upon its being a separate, defined system with established boundaries and regulated interaction with the other schools. Placed within another functioning system which will have many advantages of size, resources, and established modes of operation, Model School components are at a serious disadvantage. A follow-up study is planned on its components with measures being taken of students' perceptions of learning environment, self-concept, and the collection of descriptive data on curriculum.

We believe this project illustrates the importance of a comprehensive measurement, the need to gather a broad variety of data, and the importance of randomization as an experimental control in evaluating change in a curriculum system. These requirements mandate that the evaluators be brought in early in project planning, and the evaluation designs be built as the project is developed.

Case Two--Forrestville

Forrestville is a small school district that consists of seven elementary schools and two junior high schools. Due to housing patterns one of the elementary schools had a 90% black population. Open enrollment had been tried and the population ratio of white to black rose to 30%. However, the State Superintendent of Public Instruction ordered the busing of students until all schools had an equal proportion of 20% black to white. Forrestville whites are middle class professionals and skill tradesmen. The blacks are poorer and less well-educated, but employed in steady jobs with many households having the benefit of two incomes.

There are sizable differences in achievement between black and white students in the same grade, and from this knowledge considerable public

anxiousness was aroused concerning the lowering of achievement accompanying the busing of students. An outside evaluator was asked to conduct an evaluation of the effects of busing on the curriculum outcomes. Due to community tensions and the administrative organization of the school, the evaluation was under several constraints. A limited amount of money for evaluation restricted the amount of data that could be gathered and processed; student identification numbers were changed every year so despite a two-year study the same students could not be followed over the two years.

Believing that busing would be a major structural change and that students would be influenced by this change, an evaluation design was planned that looked at three levels of data: (a) student achievement (n=2500), (b) students' perception of learning environment (n=2500), and (c) student behavior at the junior high school (n=700). In the third area of data it was premised that earlier experiences with integration in the grades might have an effect on reduction of interracial conflict in the junior high schools.

Due to the limitations and constraints on the design, comparative judgments were much more limited than in the study at Clocksville. In the first year of the study the main comparisons were made on pre- and post-test data on math and reading achievement which found both black and white students making gains in about the same ratio as previously. There were no grades that were scoring higher on negative perceptions of the learning environment for the white students. However, without any previous data on the two groups these data could not be interpreted for change in this variable in the first year. A number of other analyses were run on these two sets of data but little emerged.

On the third area of student behavior in the two junior high schools, records were kept of all behavioral incidents referred to the guidance counselors for the year. A number of analyses were made of these data to check hypotheses on interracial conflict, teacher-pupil conflict, types of incidents reported, rate of behavioral incidents per week and month, sex differences, and number and type of behavioral incidents. There were many more behavioral incidents reported for blacks than for whites. In student-student conflict the incidents tended to be more intraracial than interracial. Of these analyses one of the most meaningful was the limited number of students accounting for a high number of incidents (See Figure 2). From these data the evaluator recommended that the students who were high in behavioral incidents receive concentrated social services and special attention in planning their program of studies for the next year. In the next years' data it is interesting to note that while several of these students remained at the junior high school none of their names appeared on the high behavioral incidents report. Again, without previous data for comparison these results had to be treated as descriptive.

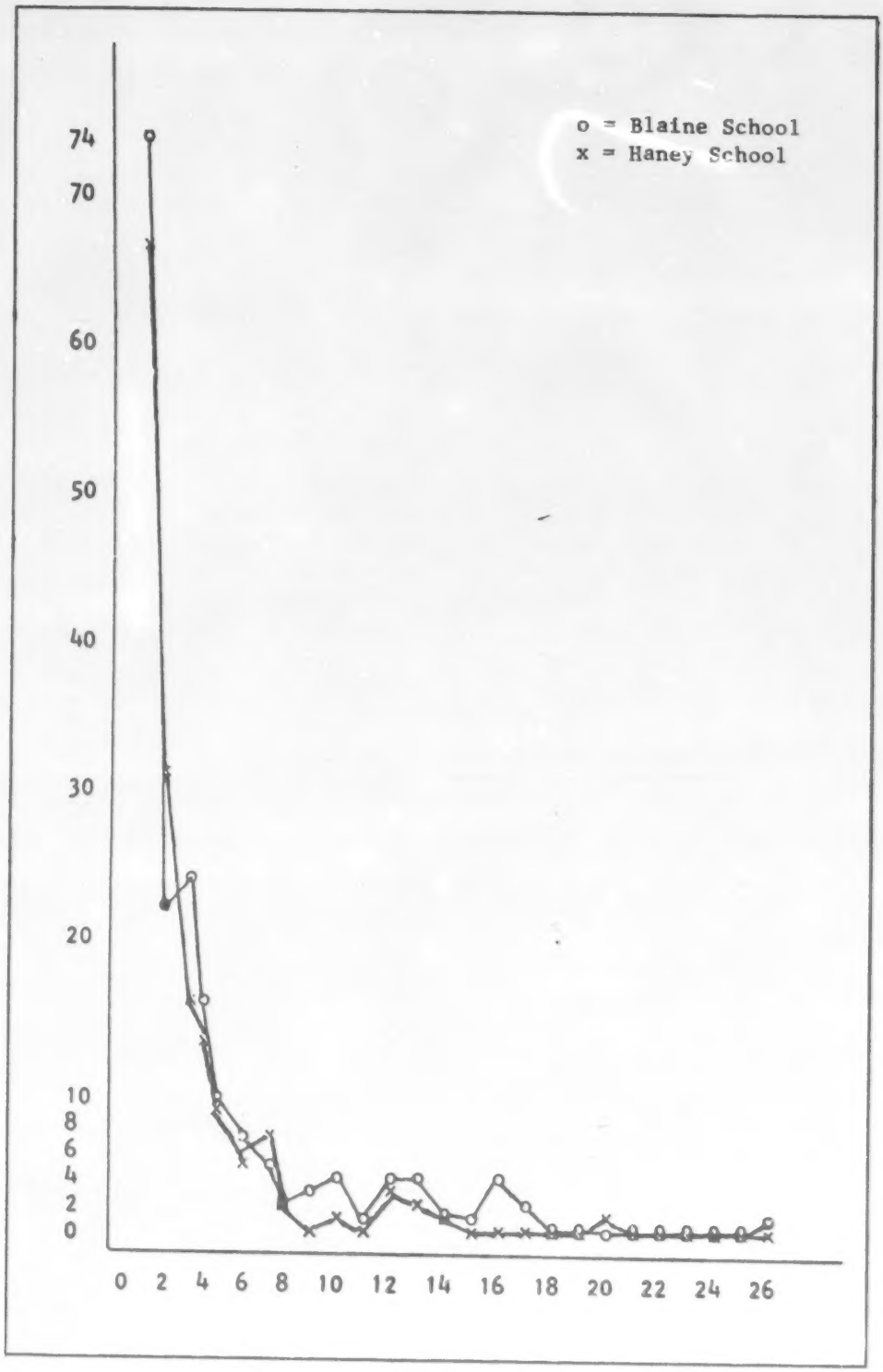

Figure 2. Summary graph of frequencies of behavioral incidents.

A second year study was made drawing on the same data sources which permitted comparison of the two-year's results. During the second year the analysis of achievement found that the majority of black students by grade had a higher gain in rate of achievement than in the previous year. About one-half of the white students showed gains in rate of achievement, and no grades, either black or white, had a statistically lower rate of gain in achievement. Further analysis of achievement by school found that black children were doing much better in certain schools than others. Also, in the second year analysis an in-service training program in math showed results for black children in the two grades whose teachers had been involved.

The perceptions of learning environment changed markedly in the second year with both whites and blacks scoring lower on the negative scales of friction, competitiveness, and difficulty. In addition there was a gain in positive perceptions especially by whites. While positive perceptions of learning environment trailed off somewhat in eighth grade both years, the second year means were still higher than those obtained in the eighth grade in the previous year.

The analysis of behavioral incidents in the junior high schools showed a reduction in conflict between white and black students. There also was less defiance of authority by black students, i.e., walking out of class, and name-calling directed at teachers. The typical behavior problem reported in the second year related to classroom work, i.e., refusing to do assigned work, making noise, being unprepared, and talking in class. Again, a small proportion of students (n=10; different names, but in the same ratio as in the first year) accounted for about one-fourth of the total behavioral incidents reported (n=119).

Conclusion

The two curriculum systems, their changes, and evaluations were directed to changing the effect of the program on students, both in a short range and a long range. In the case of Clocksville, the concern for improvement of students' learning experiences in a junior high school resulted in a curriculum system where students would have more control over the choice and organization of learning experiences. At Forrestville the change in the curriculum system was structural as it first reorganized interaction patterns among students and staff through required busing. In both cases, the evaluation design, within the limitations of fiscal resources and political constraints, organized data collection to garner information on a broad variety that were sensitive to qualities of student life effected by these changes. Where curriculum systems are changed through the local system or building unit, systems approaches can be useful in aiding the design of evaluation for monitoring change (Watson, 1967). The experience with the two case studies has prompted the Office of Evaluation Research to draw some tentative conclustions:

1. Viewing curriculum as a system rather than relatively isolated variables: subject matter input, narrow cognitive processes, and unitary teaching strategies call for broadening the data base of evaluation.

Moreover, data collection has moved toward obtaining low inference data on behavioral as opposed to high inference approaches. This has required computer capacity to batch process sizable amounts of data and to pay more attention to designing analysis. It is found that we generate many of our hypotheses as we study results, rather than simply testing a priori hypotheses. A second consequence of broadening the data base permits the development of baseline data and the generation of comparisons in natural settings; a process which has always posed difficult problems for evaluators. At Forrestville the lack of controls hampered interpretation the first year, but the behavioral incidents record was extremely useful for planning changes in the curriculum system as it proved to be a sensitive indicator on student behavior which was strongly affecting the system's functioning.

2. Systems thinking has emphasized system to system as opposed to a more isolated individual to individual comparison. In the Clocksville education the significance of the curriculum system developed in the Model School became much clearer when the ambience of the Model School was compared to the other junior high schools. As a learning environment it was indeed different in the humanistic dimensions that were sought by its originators. Evaluation comparisons of student to norm groups in standardized measures, designated without attention to the system in which the measures were made, overlook these subtle but significant system influences on educational goals. Similarly, the Forrestville evaluation revealed schools where black children were reporting a more favorable psychological press and better academic achievement. While causal variables were not delineated as well as in the Clocksville study, these results have focused further lines of inquiry and organized inputs to social services and curriculum.

3. Systems, as stated earlier in this paper, have characteristics that are emergent or established that require attention in an evaluation design. While this subject deserves an essay in itself, the discussion here will dwell on one aspect high-lighted in these two cases--the great need for longitudinal evaluation. Clocksville was an emergent operating unit as a curriculum system. First year results permitted the detection of trends. Second year results were clear and unambiguous on most of the goals. Forrestville's second year evaluation was far more informative when the first year could be used as a control. In the main, educational evaluation in natural settings has not been longitudinal but cross-sectional and this seems to violate some major tenets about systems which could contribute to misleading findings. And, given the dreary results from the studies on busing, Forrestville appears to have recorded an exception in improving the quality of school experiences for both races (Armor, 1972).

4. Evaluation research can be enhanced through incorporation of systems approaches and traditional research design. As one example, at Clocksville the randomization of subjects to treatments greatly strengthened the chances to study the differential effects of the junior high schools on the control groups and sharpened the differences of the Model School curriculum system. Evaluation of curriculum systems has been greatly handicapped by the inability to attribute results to treatments.

This age-old problem needs to be restudies bringing together systems approaches and traditional research design.

5. Obtaining quality evaluation data for the practitioner, if one approaches the curriculum as a system, assumes equal importance with the concern for the technical design of evaluation. If evaluation is done over a period of time practitioners have a strong need for information to make policy and guide practice. From the experience with these two projects and many others, the best results are obtained when the evaluator is brought in on a project early and builds the design as the project is conceptualized. Many of the sticky problems such as data collection and selection of subjects are handled rather routinely as practitioners achieve an understanding of the evaluation design to be used in the project. Moreover, it is found that a more realistic view of evaluation and its usefulness is built during this period of forming up a project.

Curriculum systems are major ways in which society and educators have attempted to influence the experience of students immediately and for the future. Curriculum systems change has always been predicted on improvement of the present state practice, but evaluation efforts have largely paled when called upon to render evidence on whether results confirmed expectations. Systems thinking has a contribution to make to both planning curriculum systems and their evaluation. These two case studies have explored a limited number of the potentials of systems appraoches for evaluation.

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Footnotes

[1]The Learning Environment Inventory (LEI) (Anderson and Walberg, 1971) is a four-point scale consisting of the following items: cohesiveness--the extent to which the class develops a feeling of intimacy as a result of student interactions; diversity--the extent to which the class provides for a diversity of pupil interests and activities; formality--the extent to which behavior within the class is guided by formal rules; speed--the rate of progress of the class; environment--the extent to which the physical environment is spacious and furnished to students' interests; friction--the extent of disagreement, tension, and antagonism in the class; goal direction--the extent to which classroom goals are recognized and accepted by the class; favoritism--the extent to which pupils have a low academic self-concept (essentially a negative affect); cliqueness--the extent to which subgroups, or cliques, exist within a class; satisfaction--the extent to which students like their class; disorganization--the extent to which pupils consider their class disorganized; difficulty--the extent to which students consider their courses as being difficult; apathy--the extent to which students within the class feel an affinity with class activities; democratic--the extent to which pupils perceive a democratic, as opposed to authoritarian, classroom atmosphere; competitiveness--the extent to which students perceive an atmosphere of competition in the classroom.

[2]The "How I See Myself" self-concept scale (Gordon, 1968) is a five-point scale consisting of the following dimensions: teacher-school; physical appearance; interpersonal adequacy; autonomy; academic adequacy; physical adequacy; emotions.

[3]The Classroom Observation Form (Kunkel and McElhinney, 1968) is a five-point scale consisting of the following dimensions: instructional materials and personnel; classroom interaction; classroom interaction--rewards and punishment; classroom interaction--climate; pupil behavior; teacher and teaching characteristics; teacher and teaching characteristics--the learning experience.